DEPARTMENT OF VETERANS AFFAIRS
Veterans Health Administration
National Health Physics Program
2200 Fort Roots Drive
North Little Rock, AR 72114

In Reply Refer To: 598/115HP/NLR

SEP 19 2011

Kevin G. Null
Division of Nuclear Material Safety
Nuclear Regulatory Commission (NRC), Region III
2443 Warrenville Road, Suite 210
Lisle, Illinois 60532-4352

Re: NRC Master Materials License 03-23853-01VA; VHA Permit Number 04-23242-01

Dear Mr. Null:

I request release, for unrestricted use, of Building 2 at the VA Palo Alto Health Care System, Palo Alto, California. Building 2 is located at 3801 Miranda Avenue, Palo Alto, California. As supporting information, I am enclosing a radiological decommissioning report prepared for the building by a contractor. The documentation provides information consistent with decommissioning survey requirements in 10 CFR 30.36 and demonstrates the building is acceptable for unrestricted use under criteria in 10 CFR 20.1402.

As information, the derived concentration guideline levels (DCGLs) used for the release survey are listed in Table 7 of the report. The DCGLs for H-3 and C-14 are well below screening levels in Table B.1 of NUREG-1757, Vol. 1, Rev. 2, and correspond to a dose level of about 0.5 mrem/year based on building occupancy scenarios used to determine the values in the NUREG. Based on evaluations by my staff using NRC software D&D, Version 2.1.0, for a building occupancy scenario (with default parameter values, a "constant" distribution, and an "unlimited" area of contamination), the DCGL for Ca-41 was determined to be associated also with a release level of about 0.5 mrem/year. Similarly, my staff determined the value stated for U-238 is associated with a dose level of about 25 mrem/year. A higher value was necessary for alpha emitters due to instrument sensitivity. In addition, to these total activity limits, the contractor applied removable activity limits of 1000 dpm/100cm^2 for beta emitters and 20 dpm/100 cm^2 for alpha emitters. These levels are consistent with values specified for unrestricted areas in NUREG-1556 series documents.

Minimum detectable concentration (MDC) values for measurement techniques were sufficiently low to provide reasonable assurance that residual radioactivity could be

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detected below the 25 mrem/year release criterion in 10 CFR 20.1042 as well as the additional removable activity levels specified in Table 7 of the survey report. All beta measurements were well below the most restrictive DCGL level for beta emitters. All alpha measurements were below MDC values.

My staff reviewed the NRC docket files you provided for the facility and identified one additional room (A107) in which radioactive materials were used. Correspondence included in Enclosure 2 between my staff and the Radiation Safety Officer indicated that any residual activity that could be present from sources used in this room would be well below levels of concern and support release for unrestricted use per 10 CFR 20.1402.

The health care system plans to demolish Building 2 and construct a new building to provide medical services for veterans. Construction of the new building is planned for FY 2012.

If you have any questions or comments, please contact Thomas E. Huston, Ph.D., National Health Physics Program, at 501-257-1578.

Sincerely,

GE Williams

Gary E. Williams
Director, National Health Physics Program

Enclosures (2)

Enclosure 1

Radiological Decommissioning Report for Building 2

PHILOTECHNICS

Radiological Decommissioning Report

UNITED STATES
DEPARTMENT OF VETERANS AFFAIRS

Prepared for:
U.S. Department of Veterans Affairs
Palo Alto Health Care System
Building 2
3801 Miranda Ave.
Palo Alto, CA 94304
Radioactive Materials License #0676-43

Survey Dates: June 13 – 16, 2011
Report Date: July 6, 2011

Prepared by:
Philotechnics, Ltd.
7384 Trade St.
San Diego, CA 92121

DECOMMISSIONING REPORT CONTENTS

ACRONYM LIST

ALARA	*As Low As Reasonably Achievable*
Bldg	*Building*
CFR	*Code of Federal Regulations*
CPM	*counts per minute*
D&D	*Decontamination and Decommissioning*
$DCGL_W$	*Derived Concentration Guideline Level – Wilcoxon Rank Sum*
DPM	*disintegrations per minute*
HASP	*Health and Safety Plan*
HSA	*Historical Site Assessment*
keV	*kiloelectron volt*
LBGR	*Lower Bound of the Gray Region*
MARSSIM	*Multi-Agency Radiation Survey and Site Investigation Manual*
MDC	*Minimum Detectable Concentration*
NRC	*U.S. Nuclear Regulatory Commission*
NUREG	*Nuclear Regulatory Commission Guidance Document*
RAM	*radioactive materials*
Rm	*Room*
TEDE	*Total effective dose equivalent*
RAM	*radioactive materials*

Section 1.0 – Executive Summary

A radiological survey was completed utilizing the guidance provided in NUREG 1757, "Consolidated Nuclear Materials Safety and Safeguards (NMSS) Decommissioning Guidance" and recommendations from NUREG 1575, "Multi-Agency Radiation Survey and Site Investigation Manual" (MARSSIM) in order to provide pertinent information for the radiological decommissioning of specified impacted areas at the U.S. Department of Veterans Affairs – Palo Alto Health Care System (VAPAHCS) facility located at 3801 Miranda Ave. A review of all data collection and analysis supports our professional opinion the 18 former radiologically impacted areas of VAPAHCS Building 2 meet the release criteria for unrestricted use based upon the following:

- ***All scanning measurements were less than the Derived Concentration Guideline Level ($DCGL_W$) which was established using a dose based criteria of 0.5 mrem/yr.***
- ***All static measurements were less than the established $DCGL_W$.***
- ***All wipe survey results were below the established removable $DCGL_W$.***

Section 2.0 – Project Scope, Findings and Summary

Prior to releasing the previously impacted areas, the Nuclear Regulatory Commission (NRC) requires that an appropriate decommissioning survey and report be submitted for their review. This document provides the licensee with appropriate information to release the 18 former laboratories being surveyed for unrestricted release.

In accordance with our agreement with the VAPAHCS, Philotechnics performed final status surveys of specific rooms in Building 2 (Rooms A04, A05A, A05, A06, A06B, A008, A009, A010, B121-B124, B126-B128, B131A, B131B and B131C). The final status survey, report and analytical data provide pertinent information for the radiological decommissioning and follow the guidance in NUREG 1757, NUREG 1575 and NUREG-1507. Research involving the use of radioactive materials was performed in the rooms listed above located in Building 2.

The following summarizes the independent conclusions representing Philotechnics best professional judgment based on information and data available to us during the course of this project. Factual information regarding operations, conditions and test data provided by the client, owner or their representative has been assumed correct and complete based upon careful and diligent review of the radiation safety program and past inspection records. Additionally, the conclusions presented are based on the conditions that existed at the time of the assessment. Note that on-site observation of the above referenced facilities consisted of readily visible, accessible areas only.

Table 1: Assessment Review

Assessment Component	Acceptable	Unacceptable	Section
License Review & Historical Use	X		4.0
Radiation Surveys			
A) Static Measurements – Hand-held instruments	X		5.0
B) Static Measurements – Scintillation Counter	X		5.0
C) Scanning Measurements – Hand-held instruments	X		5.0

Conclusions and Recommendations

Based upon the results of our survey, it is our professional opinion the 18 former laboratory areas in Building 2 are free of any radioactive contamination and/or radioactive material sources and may be released for unrestricted use in accordance with Code of Federal Regulations, Title 10, Section 30.36 "Expiration and termination of licenses and decommissioning of sites and separate buildings or outdoor areas.". During the survey, Philotechnics verified that all labels, signs or other similar markings indicating the presence of radioactive materials had been removed or obliterated. Additionally, no concerns requiring further investigation exist at this time.

Project Team

The project team consisted of the following individuals:

Researched by:	Robert Trimble and Dave Aguero
Surveyed by:	Dave Aguero, Doug Bassett, Steve Beck and Garrett Eastman
Written by:	Dave Aguero
Project Manager and Contact:	Dave Aguero

Closing

We appreciate the opportunity to provide this radiological decommissioning report and trust that the enclosed information is adequate for decision-making needs. Should you have any questions, please do not hesitate to call the undersigned.

Dave Aguero
Project Manager
Philotechnics, Ltd.

Section 3.0 – Assessment, Methodology and Report Limitations

The decommissioning process evaluates a property's environmental status for release of affected areas to allow unrestricted use by current or future tenants. The assessment involves the review of operations as they pertain to radioactive materials (RAM) use in order to identify potential radioactive contamination.

Assessment activities related to the laboratory decommissioning for the facility included the following tasks:

- A visual survey of historic RAM use and storage areas in order to identify potential contamination and/or presence of radioactive materials
- Interviews with EH&S and client personnel regarding the historical use of RAM at the facility
- Review of existing documentation, as provided, regarding prior inspections, investigations, events or conditions at the facility related to RAM use
- Direct surveys of all laboratory areas with the use of portable hand-held radiation detection equipment to identify the presence of radioactive materials
- Indirect surveys to test for removable contamination with the use of a scintillation counter and wipes taken throughout the impacted areas
- Preparation of a report documenting our findings, recommendations, and professional opinions regarding observed or suspected radiological concerns

Facility Point of Contact

At the facility, Dave Aguero met with Ms. Arefeh Shanjani and Ms. Leanne Amoroso, who are Senior Health Physicists at Stanford University. The EH&S Department at Stanford University provides radiological oversight for the VAPAHCS. Ms. Shanjani and Ms. Amoroso were able to provide specific information regarding radioactive materials use based upon their historical knowledge of the facility and implemented practices.

Report Limitations

This report has been prepared solely for the use and benefit of the VAPAHCS in compliance with requirements and recommendations by the NRC. Our professional services have been performed, our findings obtained and our recommendations prepared in accordance with customary principles and practices in the field of environmental science. This warranty is in lieu of all other warranties either expressed or implied. Philotechnics is not responsible for the independent conclusions, opinions or recommendations made by others based on the field exploration presented in this report.

It must be noted that no investigation, or survey, can absolutely rule out the existence of radioactive materials. However, the survey was performed using acceptable industry practices and utilizing appropriate technology to provide statistical confidence with the data provided. This assessment has been based upon prior history, observable conditions, direct surveys and indirect surveys. There are limitations based upon this approach where contaminants can escape detection using these methods. Minimum detectable concentrations have been specified for the instrumentation used to qualify the detection limits.

Section 4.0 License Review and Historical Use

Radioactive Materials (RAM) License

This decommissioning project for unrestricted release pertains to all radiological impacted areas identified in Building 2 located at 3801 Miranda Ave. operated under VAPAHCS Radioactive Materials Use Permit. A summary of areas where radionuclides were historically used or stored is detailed in the Restricted Area Summary (Table 2). VAPAHCS has a broad scope radioactive materials license and is allowed to possess any radionuclides with atomic numbers 3 through 83 and tritium (H-3). Radioactive material usage consisted of H-3 and C-14 on the first floor, while U-238 and Ca-41 were used in specific rooms in addition to H-3 and C-14 in the basement of the VAPAHCS Building 2.

Restricted Area Summary

The VAPAHCS requires the removal of Building 2 from their permit before they can be released for unrestricted use and ultimate dismantlement. Areas where radioactive materials were historically used or stored are summarized in Table 2 below and are identified on the building diagrams in Appendix A. The survey model was developed and implemented to detect the radionuclides used in each survey unit.

Table 2: Restricted Area Summary

VAPAHCS – Building 2, 3801 Miranda Ave.		
Area	**Room**	**Historical Radionuclide Usage**
Building 2 Basement	A008	Ca-41
Building 2 Basement	A009	H-3, C-14, Ca-41
Building 2 Basement	A010	H-3, C-14
Building 2 Basement	A05A	H-3, C-14
Building 2 Basement	A05	H-3, C-14
Building 2 Basement	A04	H-3, C-14
Building 2 Basement	A06	U-238
Building 2 Basement	A06B	U-238
Building 2 1st Floor	B121	H-3, C-14
Building 2 1st Floor	B122	H-3, C-14
Building 2 1st Floor	B123	H-3, C-14
Building 2 1st Floor	B124	H-3, C-14
Building 2 1st Floor	B126	H-3, C-14
Building 2 1st Floor	B127	H-3, C-14
Building 2 1st Floor	B128	H-3, C-14
Building 2 1st Floor	B131A	H-3, C-14
Building 2 1st Floor	B131B	H-3, C-14
Building 2 1st Floor	B131C	H-3, C-14

Historical Use

Historically, H-3, C-14, P-32, P-33, S-35, Ca-41, U238 and I-125 been the primary radionuclides used in Building 2 located at 3801 Miranda Avenue. P-32, P-33, S-35 and I-125 have not been used at the site for approximately 11 years. Based on its short half-life, it was excluded from the survey design. The survey model was developed and implemented to detect the isotopes used in each specific area.

Over the years tenant improvements have taken place on the first floor of Building 2 including converting previously impacted laboratory space (Rooms B121 – B128, B131A, B131B and B131C) into pateint rooms, a day room and a dining room. These modified areas were internally surveyed by Stanford staff around April 2000 before the construction took place; however, a MARSSIM survey was not performed. Philotechnics took a conservative approach to surveying these areas by completing MARSSIM survey of the area as they are currently.

Waste Disposal

No radioactive materials remain at Building 2 of the VAPAHCS site located at 3801 Miranda Avenue. All radioactive waste and materials have been transferred to Stanford's Waste Storage Facility.

Radioactive Materials Spills

By completing a review of pertinent records and an interview with Ms. Shanjani and Ms. Amoroso, we were able to ascertain there have not been any significant radioactive materials spills affecting the specified areas. Significant spills are defined as those spills that were not readily cleaned up by the researcher and/or caused contamination to be found during follow-up or routine contamination surveys in excess of regulatory limits.

Section 5.0 – Radiation Surveys

During the period of June 13 – June 16, 2011, Philotechnics completed a comprehensive wipe and meter survey in the impacted areas listed in Table 3, which included benches, floors, sinks and cabinetry. Survey maps depicting these areas are included as Appendix B.

The following instrumentation was used to quantify radiation levels:

- Ludlum 2350-1, with the following probe
  - ✓ BP19DD (beta probe)
    Serial # 212233 (Calibrated on 9/7/10)
- Ludlum 2350-1, with the following probe
  - ✓ BP19DD (beta probe)
    Serial # 203439 (Calibrated on 9/7/10)
- Ludlum 2350-1, with the following probe
  - ✓ 43-68 (alpha probe)
    Serial # 212233 (Calibrated on 9/7/10)
- Ludlum 2350-1, with the following probe
  - ✓ GP13A (gamma probe)
    Serial # 203447 (Calibrated on 7/1/10)
- Ludlum 2350-1, with the following probe
  - ✓ GP13A (gamma probe)
    Serial # 246986 (Calibrated on 7/1/10)
- Ludlum 3030 Planchet Counter, with the following probe
  - ✓ 43-10-1 (alpha/beta probe)
    Serial # 242683 (Calibrated on 8/6/10)
- Beckman Scintillation Counter, Serial #7065636 (Operational Test 6/17/11)
  NIST certificate for H-3 and C-14 standards included

The instrument calibrations were completed using NIST traceable sources and the Certificates of Calibration are included as Appendix C.

Minimum Detectable Concentration (MDC) Calculations

Philotechnics analytical sheets are included as Appendix D, which show calculations for the static MDC for the scintillation counter, static MDC and scanning MDC for hand-held instruments. The MDC's were calculated using the most conservative background values. These calculations follow the guidance in NUREG-1575 and NUREG-1507 and the information is used to verify the effectiveness of the instrumentation used in units of dpm/100 cm^2.

Area Classifications

Based on the results of the historical site assessment, facility areas were classified as impacted or non-impacted areas. Non-impacted areas are areas with no potential residual radioactivity from licensed activities. These include all property outside the building and non-laboratory areas inside the building. Impacted areas are those areas that may have some level of potential residual radioactivity from licensed activities.

Impacted areas are typically divided into Class 1, 2, or 3 areas. Class 1 areas have the greatest potential for contamination and therefore receive the highest degree of survey effort for the final status survey, followed by Class 2 and then by Class 3. Table 3 lists the recommended maximum survey unit sizes based on floor area. It should be noted that these limits are recommended and are not absolute.

Class 1 Areas – Areas with the highest potential for contamination, and meet the following criteria: (1) impacted; (2) potential for delivering a dose above the release criterion; (3) potential for small areas of elevated activity; and (4) insufficient evidence to support classification as Class 2 or Class 3.

Class 2 Areas – Areas that meet the following criterion: (1) impacted; (2) low potential for delivering a dose above the release criterion; and (3) little or no potential for small areas of elevated activity.

Class 3 Areas – Areas that meet the following criterion: (1) impacted; (2) little or no potential for delivering a dose above the release criterion; and (3) little or no potential for small areas of elevated activity.

Non-impacted: Building exterior, outside grounds, indoor areas other than those identified as restricted areas by the licensee, and surfaces above two meters in height in the areas specified below.

Impacted Class 1 Areas: None

Impacted Class 2 Areas: Rooms A04, A05A, A05, A06, A06B, A008, A009 and A010

Impacted Class 3 Areas: B121-B124, B126-B128, B131A, B131B, B131C and the basement hallway

Table 3: Recommended Maximum Survey Unit Size Limits

Survey Unit	Class 1	Class 2	Class 3
Structures	Up to 100 m^2	100 m^2 to 1,000 m^2	No limit
Land	Up to 2,000 m^2	2,000 m^2 to 10,000 m^2	No limit

Table 4 lists the survey units and their final classification. During the survey none of the data collected during the scans, static or removable measurements warranted re-classifying any of the survey units. Each previously impacted area was made its own survey unit.

Table 4: Laboratory Classification

3801 Miranda Ave.	Survey Unit	Classification
Building 2 Rooms A008-A010	1	Class 2
Building 2 Room A05A	2	Class 2
Building 2 Room A05	3	Class 2
Building 2 Room A04 Cold Room	4	Class 2
Building 2 Rooms A06, A06B	5	Class 2
Building 2 Room B124	6	Class 3
Building 2 Rooms B121-B123	7	Class 3
Building 2 Rooms B126-B128	8	Class 3
Building 2 Room B131A	9	Class 3
Building 2 Rooms B131B, B131C	10	Class 3
Building 2 Basement Hallway	11	Class 3

Survey Methodology

Determination of Class 1 survey unit sample locations is accomplished by first determining sample spacing and then systematically plotting the sample locations from a randomly generated start location. The random starting point of the grid provides an unbiased method for obtaining measurement locations to be used in the statistical tests. Class 1 survey units have the highest potential for small areas of elevated activity so the areas between measurement locations may be adjusted to ensure that these areas can be detected by scanning techniques. The previously impacted laboratories were not initially classified as Class 1, nor upgraded to Class 1; however, the methodology is described to give a comprehensive overview of our surveying approach.

Similar systematic spacing methods are used for Class 2 survey units because there is an increased probability of small areas of elevated activity. The use of a systematic grid allows the decision-maker to draw conclusions about the size of the potential areas of elevated activity based on the area between measurement locations. All of the impacted rooms in the basement were classified as Class 2 due to the potential for radioactive contamination although it was not expected to exceed the $DCGL_w$. Beta and gamma scans and static measurements were taken in all of the impacted rooms in the basement due to Ca-41 being used in the area. Alpha and beta scans and static measurements were taken in Rooms A06 and A06B due to the use of U-238 with the electron microscope. Swipes taken in these areas were first counted in the planchet counter prior to being counted in the liquid scintillation counter. We utilized a square grid system for the Class 2 areas and the starting point was determined using a random number generator. Judgmental sample locations were add to the survey as directed by the Project Manager which included all sinks and traps.

The guidance in MARSSIM recommends simple random measurement patterns for Class 3 survey units to ensure that the measurements are independent and support the assumptions of the statistical tests. For Class 2 and Class 3 survey units, the sensitivity for scanning techniques is not tied to the area between measurement locations as they apply only to Class 1 areas. The scanning techniques selected represent the best reasonable effort based on the survey data quality objectives.

In all classifications, permanent counter tops and other horizontal surfaces which block floor surfaces, were included as a replacement to the blocked floor surface. Likewise, fixed cabinetry faces and other permanent equipment replace blocked wall surfaces.

Internal surfaces of permanent furnishings (i.e., drawer or cabinetry interior surfaces) are not included in the systematic measurement location placement. However, these surfaces were included in the scan surveys. Although not necessary, additional surface activity measurements would have been collected at each area of elevated activity identified during the scan surveys.

Background Determination

Ten (10) 1-minute ambient, floor, benchtop and drywall backgrounds were taken with each survey meter. The average of these ten measurment were used to determine the natural background levels. Appendix E provides a summary of background data points, which were collected in a non-impacted area of similar construction to the area being requested for unrestricted release. The background averages were subtracted from the gross CPM data to convert the readings to net CPM.

Ten (10) 1-minute background samples were counted on the Beckman Liquid Scintillation Counter and one 10 minute background sample was counted on the Ludlum 3030E Planchet Counter. The results for each channel of the LSC were then averaged and used in determining an average MDC for each channel.

Surface Scans

The following table compares MARSSIM recommendations and actual area coverage for the scan survey completed at the VAPAHCS.

Table 5: Scan Survey Coverage Comparison

Classification	Percentage of Surface Area Requiring Scan Coverage (MARSSIM)	VA Hospital – Palo Alto's Surface Area Scan Coverage
1	100%	N/A
2	10 – 100% (Judgmental)	100% Floors; 80% Structures
3	Judgmental	50% Floors

The scan survey percentages were chosen in order to provide a comprehensive survey of the impacted areas and provide confidence there was no contamination above the release limit present. The probes were held at a distance of ¼" to ½" above the surface moving at a scan rate of 5 cm/sec. Class 2 survey areas received a 100% scan of all accessible floor areas and an 80% scan of permanent structures. Permanent structures are defined as hoods, benches, casework and walls. Class 3 survey areas received a 50% scan of all accessible floor areas. After tenant improvements on the first floor, no permanent structures remained that required scanning. The scanned areas chosen were those areas with the highest probability of containing residual activity. These included normal foot traffic routes and floor areas in front of lab benches, fume hoods and sinks. Additional areas where scan surveys were completed included lab bench working surfaces, fume hood interior surfaces, sinks, base cabinet interiors and wall surfaces adjacent to work areas. In the event of any elevated activity noted from the survey, the location

would have been marked and additional measurements performed to quantify the activity. ***All scanning measurements collected were less than the established DCGL$_W$.***

Fixed or Static Measurements

Class 1 survey units generally consist of one or two rooms or laboratories. Class 2 and Class 3 survey units generally consist of many rooms. The MARSSIM sample measurement locations (i.e., random static and wipe measurements) for all survey units was determined by folding down the walls to create a 2-dimensional overhead map. This protocol increased the probability for finding residual contamination. Additional judgmental sample locations were always included by the Project Manager in all sink basins and traps.

The probe head was held as close to the surface as practicable to determine a count rate in counts per minute. The data calculations from this survey are included as Appendix F. ***All static measurements were below the established DCGL$_W$.***

Removable Measurements

Removable contamination measurements (smears) were collected on building structural surfaces at each sample location. Each smear encompassed an area of approximately 100cm^2; if an area of less than 100cm^2 was wiped, a comment was added to the survey data sheet estimating the surface area wiped to allow for area correction of the results. Swabs were used when system or component access points were not large enough to allow for a wipe of a 100cm^2 surface area.

Two swipes were taken for each sink in the Class 2 impacted areas; one inside the sink basin and one beyond the trap. All of the smear samples taken in the class 2 impacted areas were first counted for one minute on a Ludlum Model 3030 Planchet Counter for gross alpha and beta contamination and then counted on a Beckman Liquid Scintillation Counter (LSC) for one minute. All smear samples taken from the class 3 survey units were counted for one minute on the LSC because these areas only used H-3 and C-14. A data sheet, included as Appendix G, details the CPM results, the DPM conversions and indicates if the result is below the DCGL$_W$. The channels for the LSC were set up so H-3 would be detected in Channel A, C-14 in Channel B and all other beta emitters with energies above 156 keV in Channel C. Scintillation standards were used to determine if the LSC was operating between normal parameters. The efficiencies for the LSC were determined from the quench curves. We have included a table in Appendix C that shows the efficiencies for H-3 and C-14 based on the amount of quench. Using the FORECAST function in Excel, we extrapolated the efficiency based on the H number which Beckman uses to document the quench of the sample. The efficiencies were generally around 54% for H-3 and 95% for C-14. The total efficiency of the planchet counter was 39.49% for alpha emmitters and 46.56% for beta emmitters. ***All final wipe survey results were below the established DCGL$_W$.***

Section 6.0 - Data Quality Assessment and Interpretation of Survey Results

The statistical guidance contained in Section 8 of MARSSIM was used to determine if areas are acceptable for unrestricted release and whether additional surveys or sample measurements were needed.

The following table summarizes MARSSIM guidance for conclusions based upon data provided by the Final Status Survey.

Table 6: Guidance for Survey Conclusions

Survey Result	Conclusion
All measurements less than $DCGL_w$	Survey unit meets release criterion
Average greater than $DCGL_w$	Survey unit does not meet release criterion
Any measurement greater than $DCGL_w$ and the average less than $DCGL_w$	Conduct Sign test and elevated measurement comparison

The Derived Concentration Guideline Limit (DCGL) is used as a determining factor to the survey unit meeting the criterion for unrestricted release. Due to the current situation in California where there is not an established dose based release criteria, the $DCGL_w$'s have been selected by using a 1.0 mrem/yr release criterion with our actions levels set at 50% of the $DCGL_w$. Based on the results of the survey where all the measurements were below the DCGL, by definition, each survey unit met the release criterion.

Table 7: Established $DCGL_w$'s for Survey

Isotope	Total Activity $DCGL_w$'s ($DPM/100\ cm^2$)	Removable Activity Limit ($DPM/100\ cm^2$)
H-3	2.40×10^6	1000
C-14	7.00×10^4	1000
Ca-41	1.16×10^5	1000
U-238	100 *	20

* U-238 DCGL corresponds to a dose level of approx. 25 mrem/yr per D and D, Version 2.1.0.
TE Hunton
8/11/2011

Based on a 1.0 mRem/yr release criterion, the limiting $DCGL_w$ for beta emitters is C-14 at 1.4×10^5 dpm/100 cm^2. For alpha emitters the limiting $DCGL_w$ is U-238 at 100 dpm/100 cm^2.

Calculation of Relative Shift – Determining the Number of Samples

A minimum number of samples are needed to obtain sufficient statistical confidence that the conclusions drawn from the samples are correct. The number of samples will depend on the relative shift (the ratio of the concentration to be measured relative to the statistical variability of the contaminant concentration). The minimum number of samples is obtained from MARSSIM tables or calculated using equations in Section 5 of MARSSIM. For the VAPAHCS Building 2 project we estimated that the relative shift would be close to 3. With a relative shift of 3 and decision errors of 0.05 for Type I and Type II, the number of samples for each survey unit was determined to be 14. As a conservative measure, the minimum number of samples for each survey unit was increased to a minimum of 23. In addition to the number of samples recommended by MARSSIM additional samples were judgmentally selected by the project manager as an ALARA measure.

Table 8 compares the actual relative shift to the estimated relative shift in order to determine if the number of systematic measurements for each survey unit satisfies the statistical criteria listed in section 5 of MARSSIM. For each class 2 survey unit the actual number of locations sampled were compared to the number required by MARSSIM Table 5.5 "Values of N for Use with the Sign Test" for both beta and gamma measurements. ***As a result of the analysis, no additional sample locations were necessary.***

Table 8: Survey Unit Data Analysis

Survey Unit #	Class	Actual	Type I Error	Type II Error	Beta Relative Shift	Beta Static Locations Required	Gamma Relative Shift	Gamma Static Locations Required	Additional Static Locations Required?
1	2	33	0.05	0.05	129.6	14	80.6	14	No
2	2	47	0.05	0.05	185.1	14	57	14	No
3	2	33	0.05	0.05	54.5	14	72.1	14	No
4	2	29	0.05	0.05	55.5	14	67.1	14	No
5	2	49	0.05	0.05	56.2	14	N/A	N/A	No*
6	3	44	0.05	0.05	117.7	14	N/A	N/A	No
7	3	35	0.05	0.05	117.5	14	N/A	N/A	No
8	3	35	0.05	0.05	76.0	14	N/A	N/A	No
9	3	38	0.05	0.05	149.4	14	N/A	N/A	No
10	3	42	0.05	0.05	142.2	14	1.54	N/A	No
11	3	23	0.05	0.05	123.3	14	62.8	14	No

*Alpha measurements taken in Survey Unit 5 due to the use of U-238 with the electron microscope

Section 7.0 –Decontamination / Decommissioning Review

Decontamination

Decontamination is the physical or chemical process of reducing and preventing the spread or potential exposure from contamination. Decontamination options include the use of commercially available materials and/or equipment that will effectively remove radioactive materials from surface areas so the contamination can be collected and properly disposed.

Decontamination was not required in any of the impacted areas listed in Table 3 as part of the decommissioning survey. The survey results did not indicate the presence of any level of radioactive materials that would require decontamination based upon our established action levels. At the time of our review, the action levels were based upon 50% of the $DCGL_w$. Based on the results of the survey where all the measurements were below the DCGL, by definition, each survey unit met the release criterion.

Decommissioning Review

Philotechnics has reviewed all of the applicable data pertaining to the history of radioactive material use as well as the static and wipe surveys completed at the VAPAHCS Building 2 facility located at 3801 Miranda Avenue, Palo Alto, CA. It is our professional opinion that the facility is free of any radioactive materials and/or radioactive contamination, would qualify for unrestricted release, and may be removed from VAPAHCS Radioactive Materials Use Permit in accordance with Code of Federal Regulations Title 10 30.36 "Expiration and termination of licenses and decommissioning of sites and separate buildings or outdoor areas."

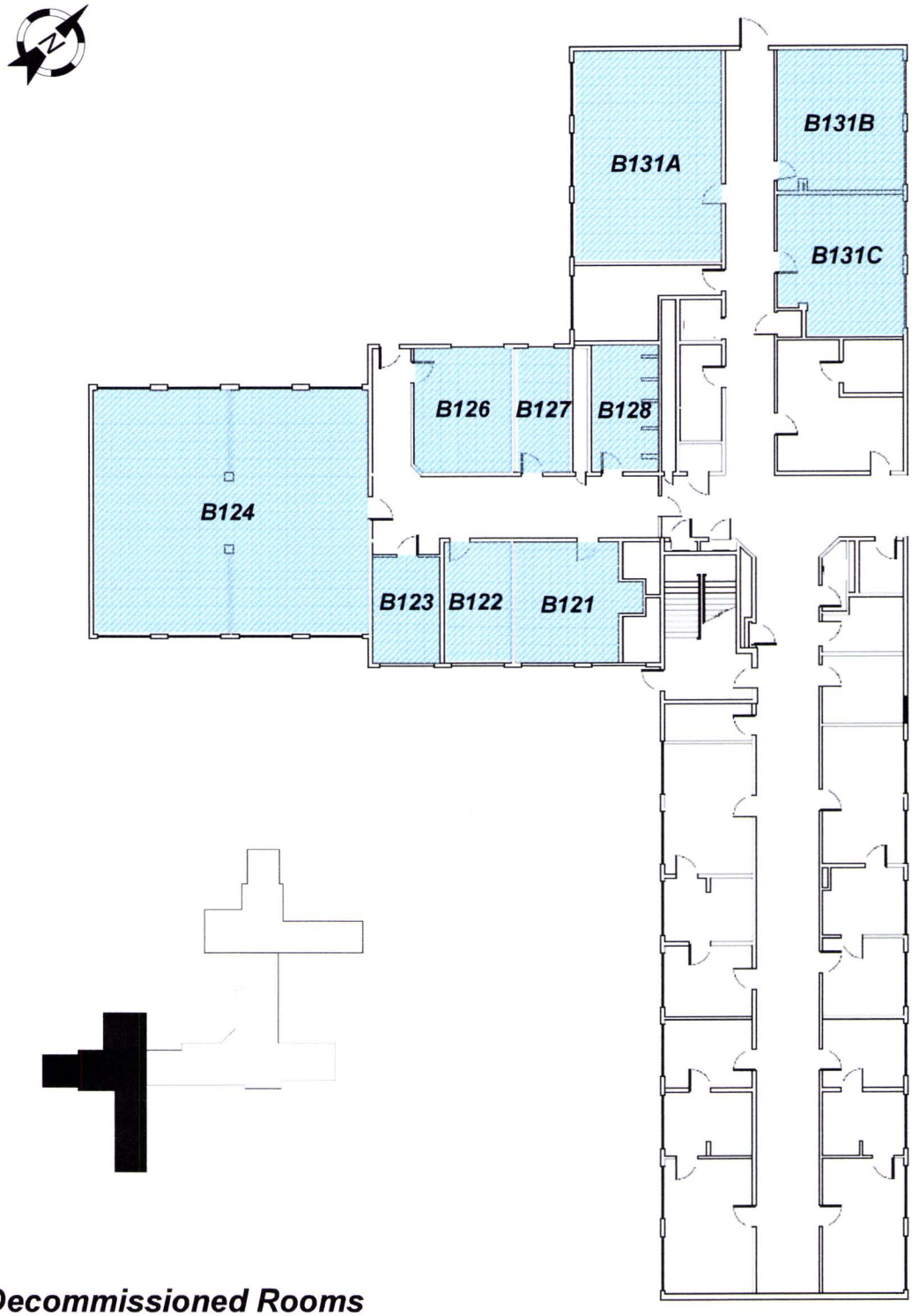
APPENDIX A

VA Palo Alto Health Care System Building 2 Site Diagram Identifying Decommissioned Areas

VAPAHCS

3801 Miranda Ave, Palo Alto, CA 94304

Building 2, B-Wing, First Floor

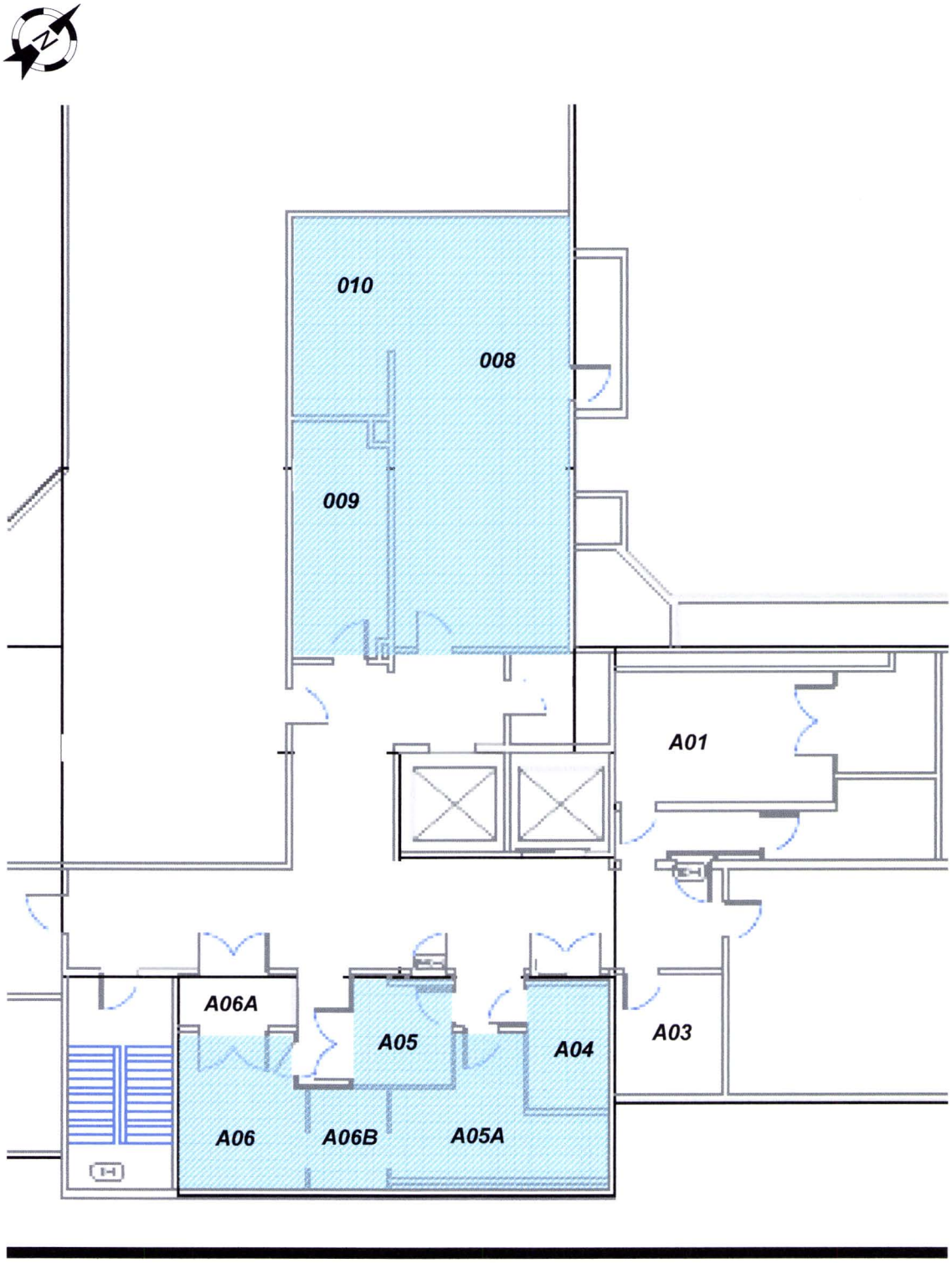


- Decommissioned Rooms

VAPAHCS

3801 Miranda Ave, Palo Alto, CA 94304

Building 2, A-Wing, Basement



- Decommissioned Rooms

APPENDIX B

VAPAHCS

Area Survey Maps

Appendix B

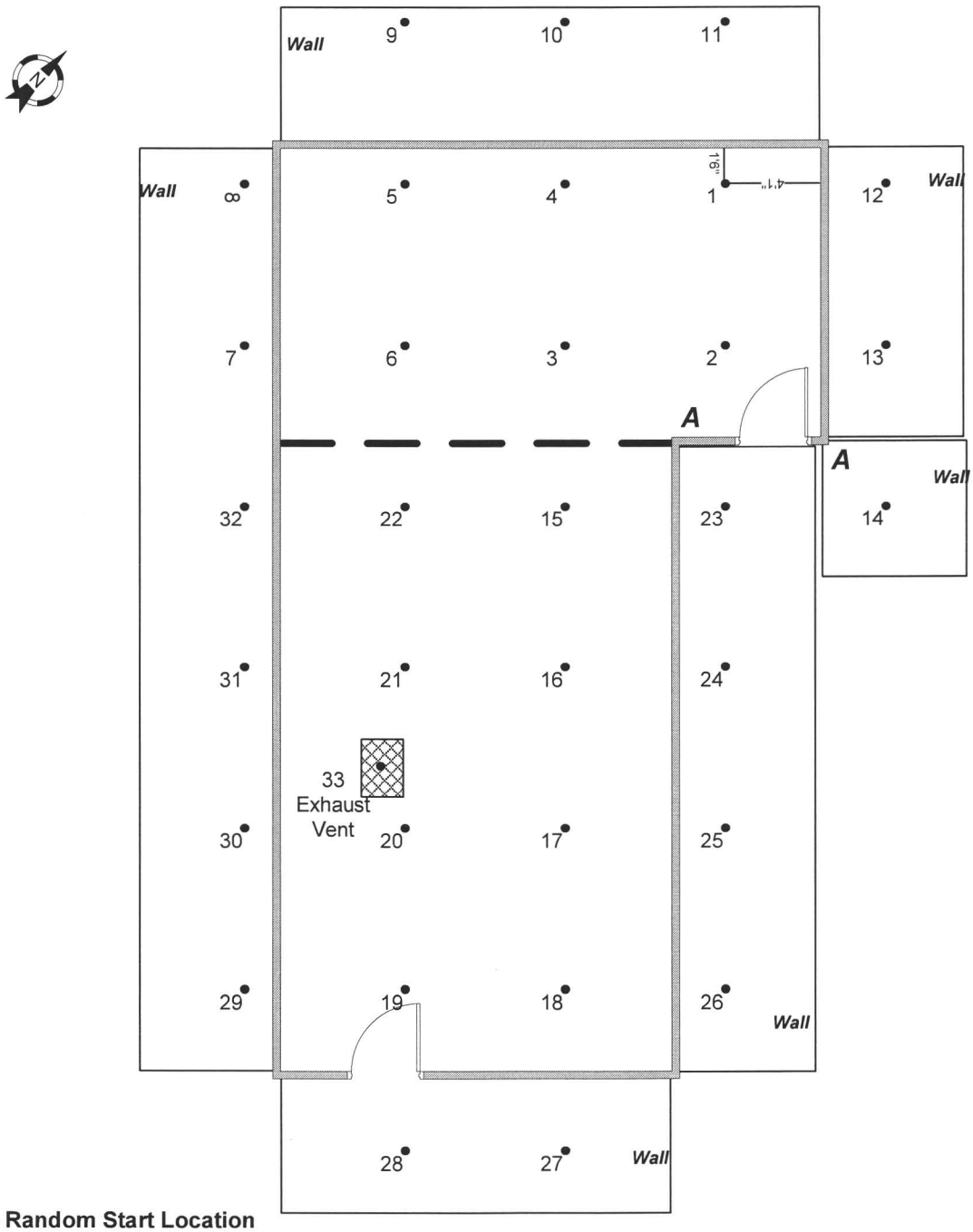
VAPAHCS

Final Status Survey Report

Building: Building 2 Area: Room A008, 009, 010 Survey Unit: 1 Date: 6-13-11 Class: 2

Instruments: Ludlum 2350-1 (Serial #212233), BP19DD Detector, Calibrated on 9-7-10
Ludlum 2350-1 (Serial #203447), GP13A Detector, Calibrated on 7-1-10
Beckman Scintillation Counter, Operational Test 6-17-11

Surveyor: Doug Bassett, Garrett Eastman, Steve Beck



◉ - Random Start Location
Sample Spacing = 2.13 m (7')
Total Area ~ 71.2 m² (767 ft²)

Appendix B

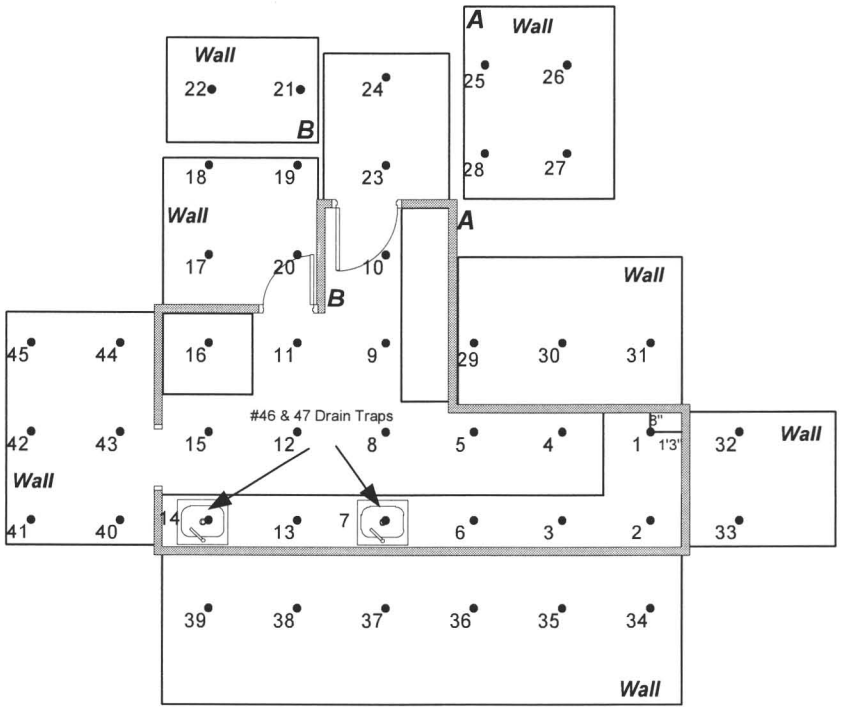
VAPAHCS

Final Status Survey Report

Building: Building 2 Area: Room A05A Survey Unit: 2 Date: 6-14-11 Class: 2

Instruments: Ludlum 2350-1 (Serial #212233), BP19DD Detector, Calibrated on 9-7-10
Ludlum 2350-1 (Serial #203447), GP13A Detector, Calibrated on 7-1-10
Beckman Scintillation Counter, Operational Test 6-17-11

Surveyor: Garrett Eastman



◉ - Random Start Location
Sample Spacing = 1.07 m (3'6")
Total Area ~ 16 m² (171 ft²)

Appendix B

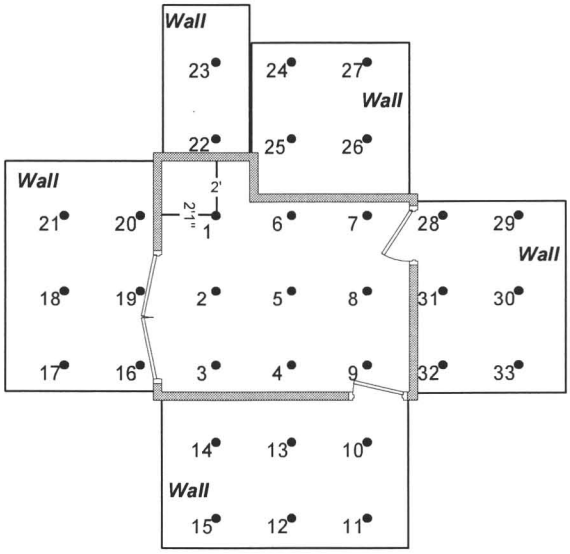
VAPAHCS

Final Status Survey Report

Building: Building 2 Area: Room A05 Survey Unit: 3 Date: 6-14-11 Class: 2

Instruments: Ludlum 2350-1 (Serial #203439), BP19DD Detector, Calibrated on 9-7-10
Ludlum 2350-1 (Serial #246986), GP13A Detector, Calibrated on 7-1-10
Beckman Scintillation Counter, Operational Test 6-17-11

Surveyor: Steve Beck



◉ - Random Start Location
Sample Spacing = 0.91 m (3')
Total Area ~ 7.3 m² (79 ft²)

Appendix B

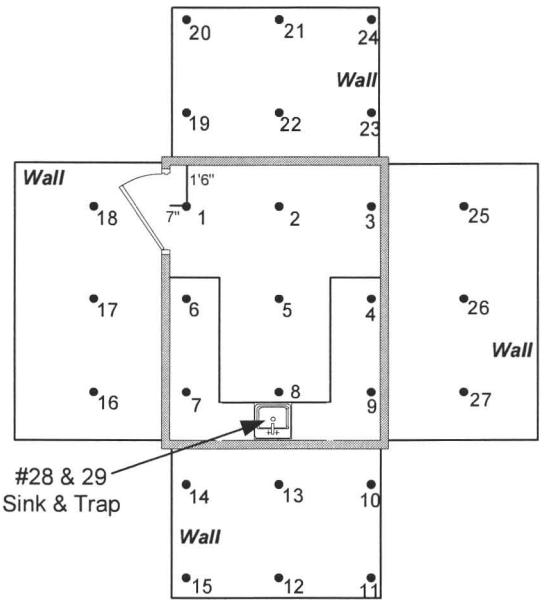
VAPAHCS

Final Status Survey Report

Building: Building 2 Area: Room A04 Cold Room Survey Unit: 4 Date: 6-14-11 Class: 2

Instruments: Ludlum 2350-1 (Serial #203439), BP19DD Detector, Calibrated on 9-7-10
Ludlum 2350-1 (Serial #246986), GP13A Detector, Calibrated on 7-1-10
Beckman Scintillation Counter, Operational Test 6-17-11

Surveyor: Steve Beck



◉- **Random Start Location**
Sample Spacing = 1.12 m (3'8")
Total Area ~ 8.5 m² (91 ft²)

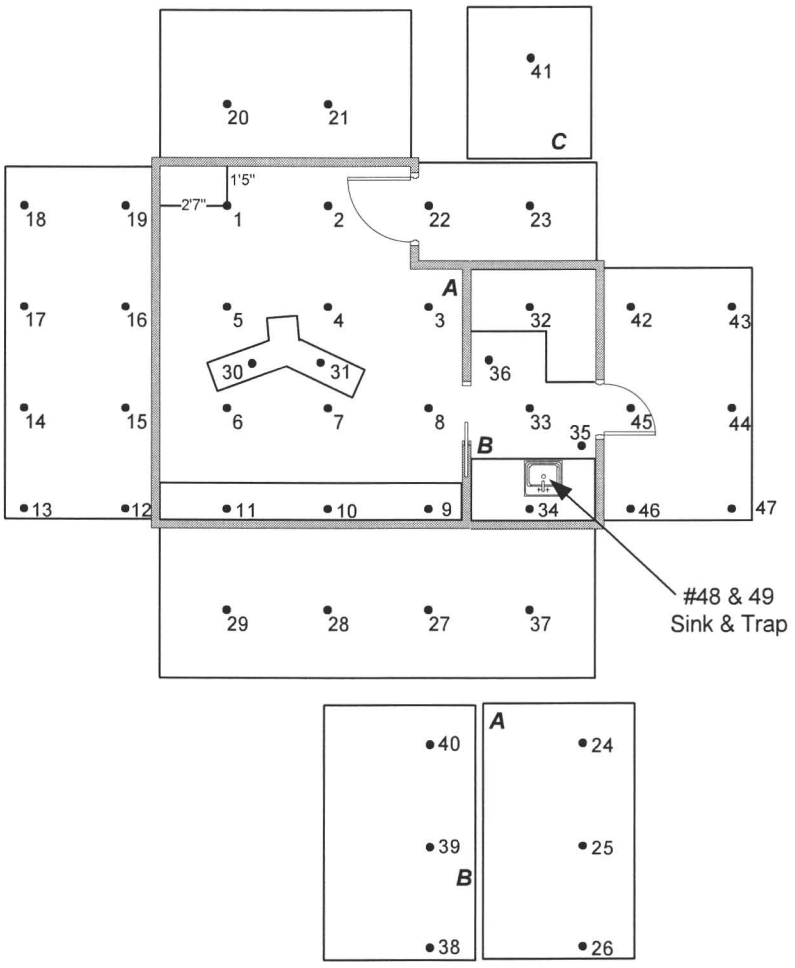
Appendix B

VAPAHCS
Final Status Survey Report

Building: Building 2 Area: Room A06, 06B Survey Unit: 5 Date: 6-15-11 Class: 2

Instruments: Ludlum 2350-1 (Serial #203439), BP19DD Detector, Calibrated on 9-7-10
Ludlum 2350-1 (Serial #212233), 43-68 (Alpha) Detector, Calibrated on 9-7-10
Beckman Scintillation Counter, Operational Test 6-17-11

Surveyor: Doug Bassett



◉ - **Random Start Location**
Sample Spacing = 1.22 m (4')
Total Area ~ 19.5 m² (210 ft²)

Appendix B

VAPAHCS

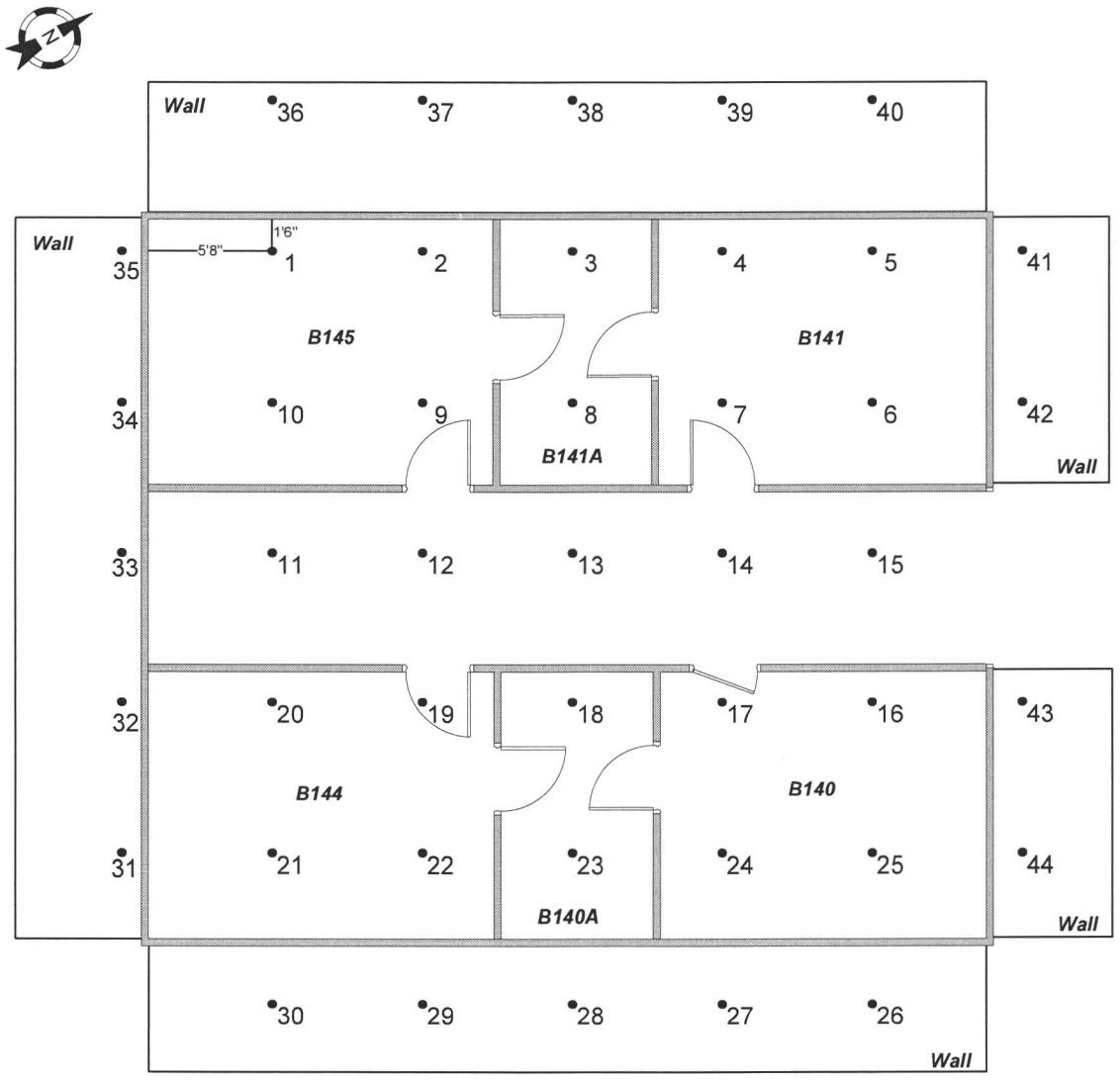
Final Status Survey Report

Building: Building 2 Area: Room B124* Survey Unit: 6 Date: 6-13-11 Class: 3

Instruments: Ludlum 2350-1 (Serial #212233), BP19DD Detector, Calibrated on 9-7-10
Beckman Scintillation Counter, Operational Test 6-17-11

Surveyor: Doug Bassett

Original Lab was B124, new room numbers and configuration are shown on the map



◉ - Random Start Location
Sample Spacing = 2.13 m (7')
Total Area ~ 120.8 m² (1300 ft²)

Appendix B

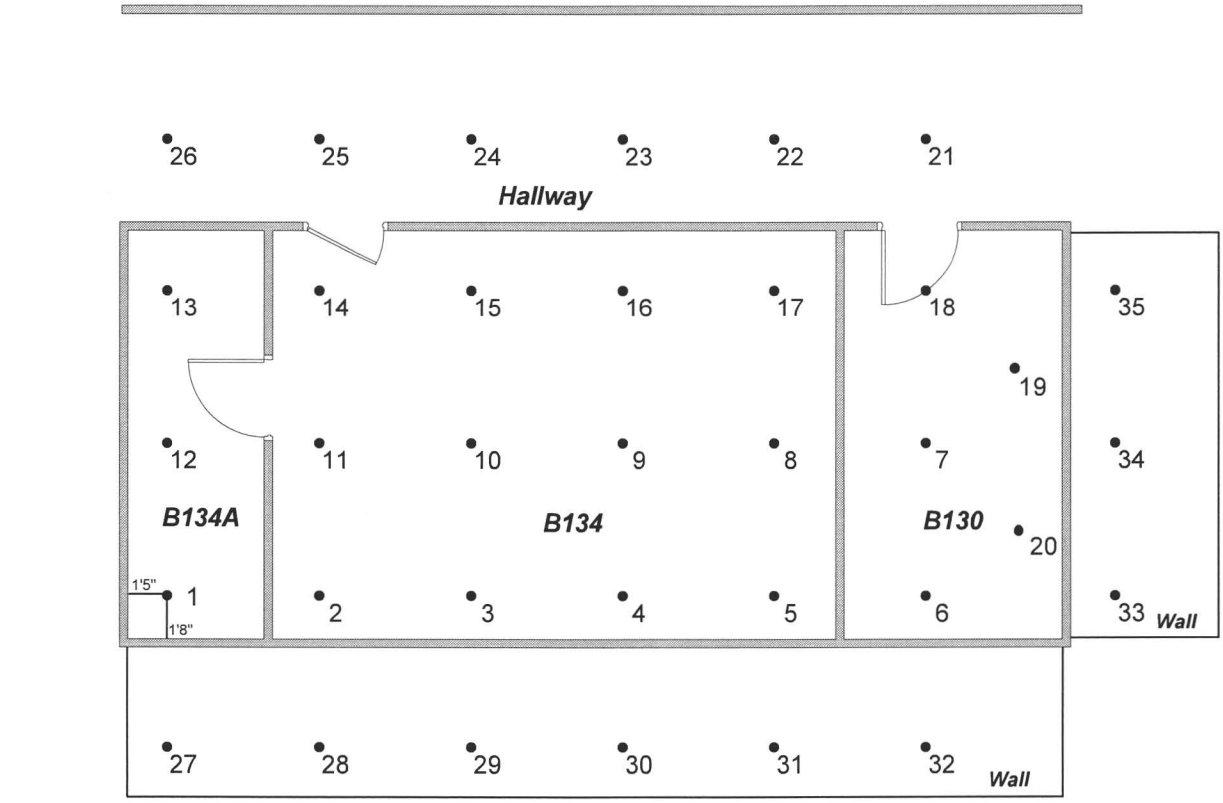
VAPAHCS
Final Status Survey Report

Building: Building 2 Area: Room B121, 122, 123* Survey Unit: 7 Date: 6-13-11 Class: 3

Instruments: Ludlum 2350-1 (Serial #203439), BP19DD Detector, Calibrated on 9-7-10
Beckman Scintillation Counter, Operational Test 6-17-11

Surveyor: Steve Beck, Garrett Eastman

Original Labs were B121, B122 & B123; new room numbers and configuration are shown on the map



◉ - Random Start Location
Sample Spacing = 1.83 m (6')
Total Area ~ 71.9 m² (774 ft²)

Appendix B

VAPAHCS

Final Status Survey Report

Building: Building 2 Area: Room B126, B127, B128* Survey Unit: 8 Date: 6-13-11 Class: 3

Instruments: Ludlum 2350-1 (Serial #203439), BP19DD Detector, Calibrated on 9-7-10
Beckman Scintillation Counter, Operational Test 6-17-11

Surveyor: Steve Beck, Garrett Eastman

Original Labs were B126, B127 & B128; new room numbers and configuration are shown on the map

◉ - Random Start Location
Sample Spacing = 1.98 m (6'6")
Total Area ~ 83.4 m² (898 ft²)

Appendix B

VAPAHCS

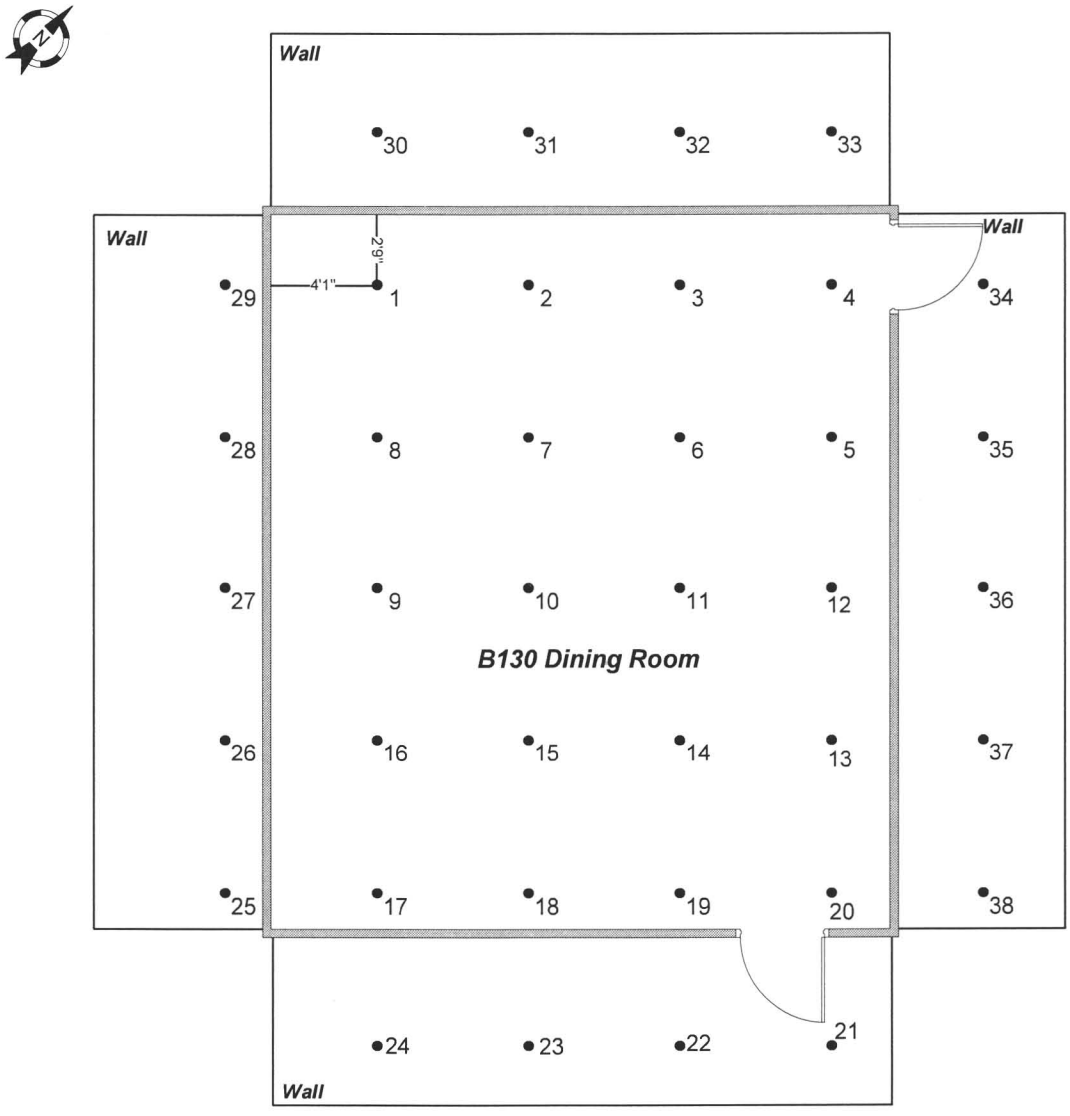
Final Status Survey Report

Building: Building 2 Area: Room B131A* Survey Unit: 9 Date: 6-14-11 Class: 3

Instruments: Ludlum 2350-1 (Serial #212233), BP19DD Detector, Calibrated on 9-7-10
Beckman Scintillation Counter, Operational Test 6-17-11

Surveyor: Doug Bassett, Steve Beck & Garrett Eastman

Original Lab was B131A; new room numbers and configuration are shown on the map



◉ - Random Start Location
Sample Spacing = 1.83 m (6')
Total Area ~ 64.3 m² (692 ft²)

Appendix B

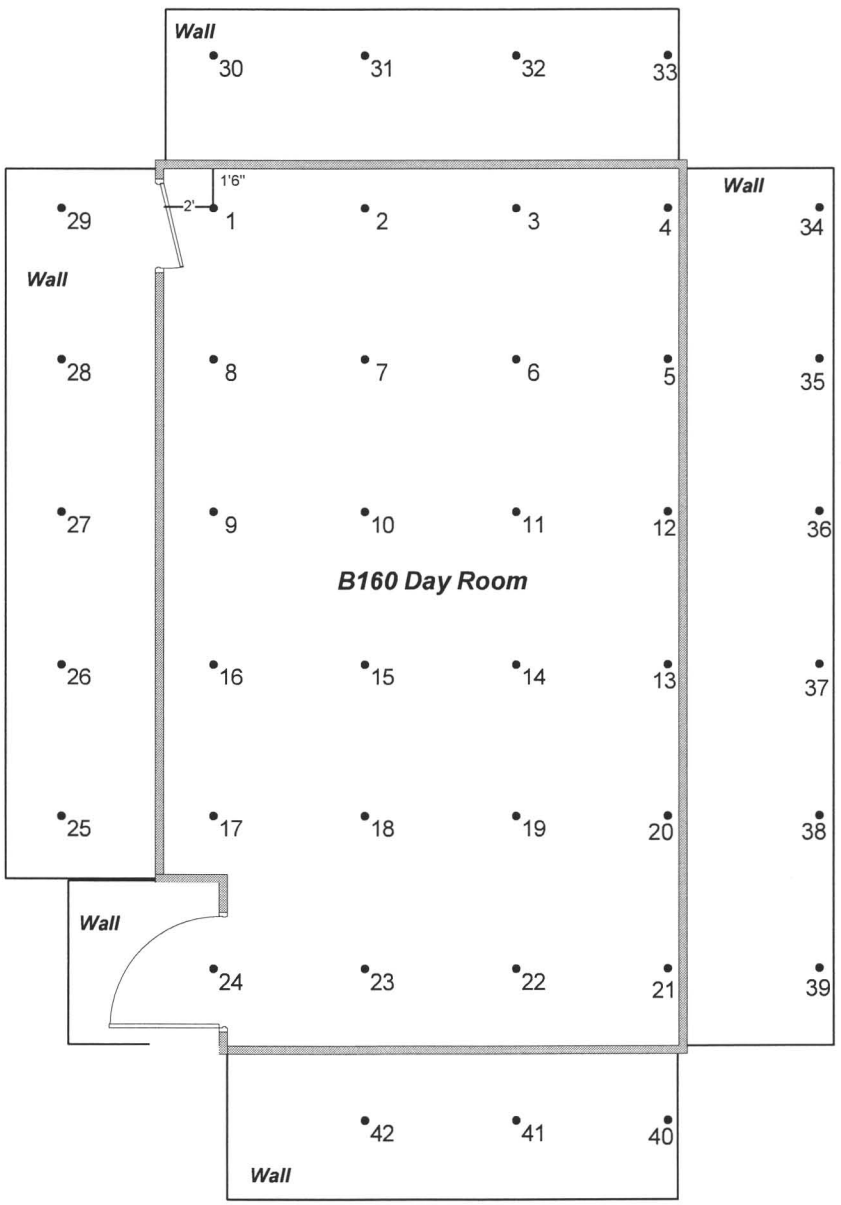
VAPAHCS
Final Status Survey Report

Building: Building 2 Area: Room B131B, B131C* Survey Unit: 10 Date: 6-14-11 Class: 3

Instruments: Ludlum 2350-1 (Serial #212233), BP19DD Detector, Calibrated on 9-7-10
Beckman Scintillation Counter, Operational Test 6-17-11

Surveyor: Garrett Eastman, Doug Bassett, Steve Beck

Original Labs were B131B & B131C; new room numbers and configuration are shown on the map



◉ - Random Start Location
Sample Spacing = 1.83 m (6')
Total Area ~ 65 m² (700 ft²)

Appendix B

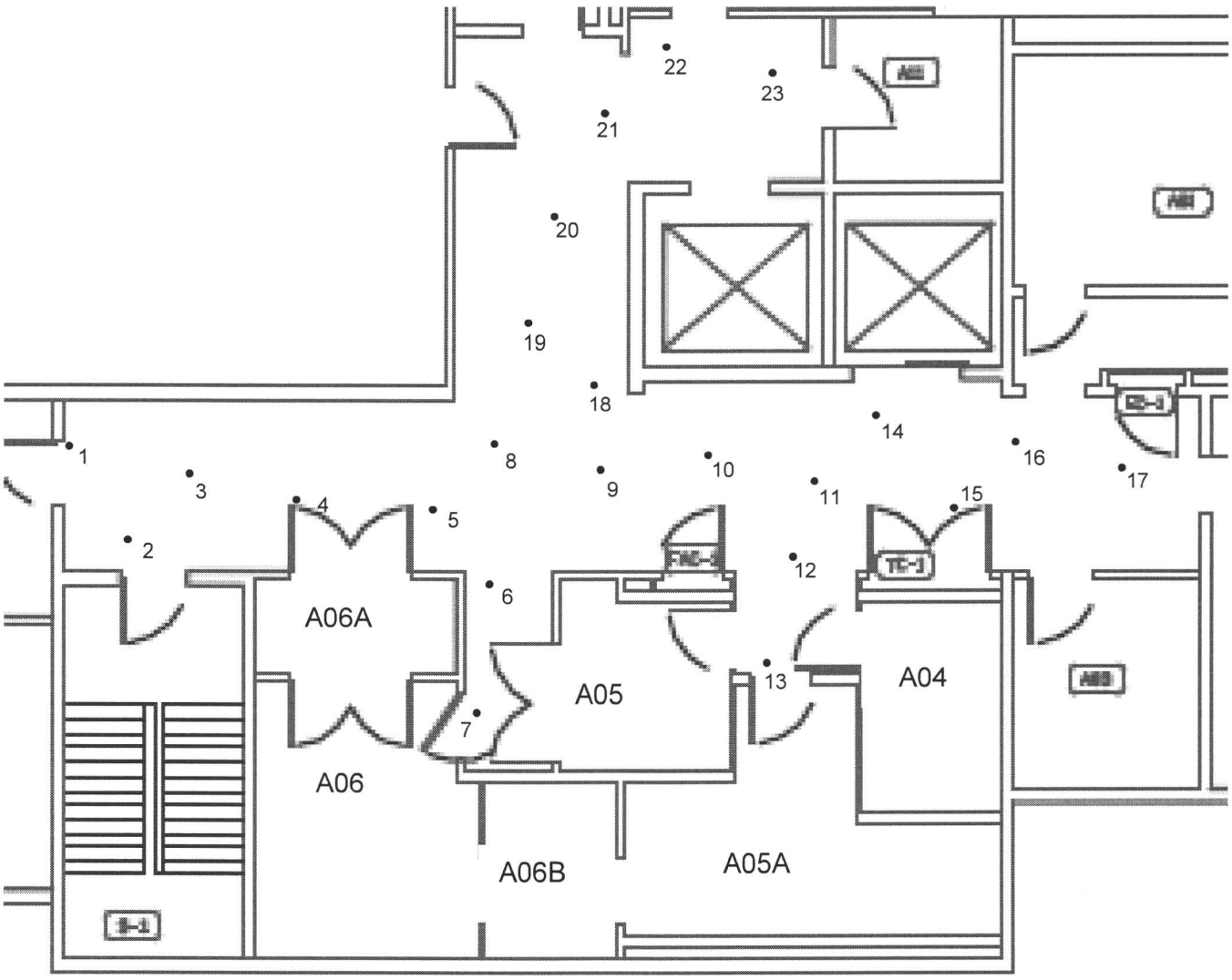
VAPAHCS

Final Status Survey Report

Building: Building 2 Area: Basement Hallway Survey Unit: 11 Date: 6-15-11 Class: 3

Instruments: Ludlum 2350-1 (Serial #212233), BP19DD Detector, Calibrated on 9-7-10
Ludlum 2350-1 (Serial #203477), GP13A Detector, Calibrated on 7-1-10
Beckman Scintillation Counter, Operational Test 6-17-11

Surveyor: Garrett Eastman, Doug Bassett, Steve Beck



APPENDIX C

Certificates of Calibration & Scintillation Check

Philotechnics Analytical Worksheet

VA Hospital - Palo Alto
Instrument Operational Check
6/17/2011

Counting Data:

Standard	CPM
H-3	53,721
C-14	42,691
Blank	36

Nuclide Information:

Analytical Sampling Date: 6/17/2011

Nuclide	Initial Activity (DPM)	Calib. Date	Current Activity (DPM)
H-3	98,800	11/26/2008	85,546
C-14	44,100	11/26/2008	44,086

Unquenched Efficiency Calculations:

Nuclide	CPM	Corrected DPM	Efficiency
H-3	53,721	85,546	62.80%
C-14	42,691	44,086	96.83%

Efficiency Used Based on Quench Curve:

H-3 Quench	
H#	Eff.
0.1	61.20%
39.8	55.95%
94.1	42.34%
132.4	33.29%
165.7	25.65%
202.8	18.25%
231.6	13.55%
253.5	10.52%
280.6	7.49%

C-14 Quench	
H#	Eff.
0.1	95.64%
46.9	94.75%
95.2	92.78%
124.4	91.27%
159.7	88.63%
204.2	84.76%
224.2	82.04%
263.1	76.05%
284.5	72.26%

Activity Calibration and Error Analysis

The ^{14}C or ^{3}H standards have been assayed for activity by comparison with the National Institute of Standards and Technology (NIST) carbon-14 solution standard, Standard Reference Material (SRM) No. 438 tartaric acid in 2M HCl, and tritium solution standard SRM No. 391-B-5, tritiated water in water. The H-Number method of calibration was used with secondary standards prepared from the NIST standard.

The estimated activities for the activity standards and the reference dates for all standards are as follows:

```
H3  DPMs:   98,800   REF DATE: 26NOV08
C14 DPMs:   44,100   REF DATE: 26NOV08
BKG DPMs:     N/A    REF DATE: 26NOV08

THE PRODUCTION SERIAL NUMBERS
FOR THE 3 STANDARDS ARE
AS FOLLOWS :

                    H3   -  HPP4811
                    C14  -  CPP0506
                    BKG  -  BPP2212
```

The overall uncertainty associated with the activity values are estimated to be less than ±3.5% for the ^{3}H and ±3.5% for the ^{14}C. These estimates are determined in accordance with error analysis procedures recommended by the International Commission on Radiation Units and Measurements (ICRU Report 12). The limits are calculated by arithmetically summing the uncertainty due to random errors at the 99% confidence level with the assessable systematic errors. Random errors arise from production and assay procedures such as dispensing, weighing, and counting. Systematic errors consist of uncertainty in the activity of the NIST-based secondary standards, overall uncertainty of the NIST SRM No. 391-B-5 as a function of time (assuming a half-life of 12.43 years and a half-life uncertainty of 0.5%); uncertainties in the standard weights used for calibrating the balances used in gravimetric determinations, losses of activity by evaporation, and uncertainties in corrections applied for the effects of impurities on the scintillation process.

Recommendations for Use

Unquenched standards can be used to:

- Calibrate the instrument. Only one of these standards, ^{14}C or ^{3}H, can be used for calibration of your instrument. Refer to your Operator's Manual for proper calibration standard instructions.

IMPORTANT Use of any other standard from this set or another set requires the construction of new quench curves.

- Measure day-to-day ^{3}H and ^{14}C counting efficiencies for comparison with original factory specifications and for verifying stable system performance.

GRIFFIN INSTRUMENTS

CALIBRATION CERTIFICATE FOR 3030E SERIAL# 242683

Owner: PHILOTECHNICS

DATE:	08/06/10	**LOCATION:**	Griffin Inst
TECH:	Joanne Glenn	**DATE LAST CAL EXPIRES:**	06/17/10

Reason For Calibration: (●) Due For Calibration ( ) Repair (See Remarks) ( ) Other (See Remarks) ( ) Due and Repair (See Remarks)

CABLE LENGTH: 39"

NIST TRACEABLE EQUIPMENT USED DURING CALIBRATION

MODEL:	M-500	**SERIAL #:**	114512	**CAL. DUE:**	07/28/11
MODEL:		**SERIAL #:**		**CAL DUE:**	

Condition: (●) Sat ( ) Unsat

AF Mechanical Zero: 0

AL Mechanical Zero: 0

Scaler Function Check	As Found	As Left		
Beta Channel Window (4-50 mV):	4-50	A.F.		
Alpha Channel Window (175 mV, 120 for 3030):	120	A.F.		
Alpha Counts w/Pulser @ 10,000 CPM:	9,960	A.F.	% Error:	0.4%
Beta Counts w/Pulser @ 10,000 CPM:	9,959	A.F.	% Error:	0.4%

HIGH VOLTAGE POWER SUPLY CAL. (2929 only)		
1 KV Reading (R-5 on HV Board):	1	A.F.
Max HV (1500 V +):	(●) Sat	( ) Unsat

REMARKS:

Does Instrument Meet Final Acceptance Criteria?: (●) Yes ( ) No

Calibration Sticker Attached?: (●) Yes ( ) No

Date Instrument is Due For Next Calibration: **08/06/11**

INSTRUMENT MARRIED WITH 43-10-1 # PR255979

Performed/Reviewed by: Joanne Glenn **Date:** 8/6/2010 **Entered by** _____ **Initials**

Calibrations performed to ANSI N323A-1997 standards.

Ludlum Measurements, Inc.
Model 3030 Parameters

8/6/2010
9:40:56 AM

Header 1: Philotechnics
Header 2: Serial#242683
Header 3: Probe#255979
Header 4:
Header 5: More Comments?
Header 6: More Comments?

Calibration Due Date: 8/6/2011

Model 3030 Date: 8/6/2011
Model 3030 Time: 8:04:00 AM

Count Time Switch (min): 0001.0
User PC Time (min): 1.0

Alpha Alarm: 999999
Beta Alarm: 999999
Alpha + Beta Alarm: 999999

High Voltage (VDC): 625

Loss of Count Time (min): 30.0

Count Mode: SCALER

Alpha Efficiency %: 38.9
Beta Efficiency %: 27.4

Background Subtract: OFF
Alpha Background: 2.0
Beta Background: 48.0

Crosstalk Correction: OFF
Alpha to Beta Crosstalk %: 2.6
Beta to Alpha Crosstalk %: 0.0

Show Parameters during startup: Enabled

Daily QC Check: OFF

Last Alpha Efficiency %: 0
Last Beta Efficiency %: 8

Standard Alpha Efficiency %: 40
Standard Beta Efficiency %: 33

Allowable Alpha QC Efficiency ± %: 15
Allowable Beta QC Efficiency ± %: 15

Alpha Source Size (dpm): 30900
Alpha Source Size (µCi): 0.01391891892

Beta Source Size (dpm): 22900
Beta Source Size (µCi): 0.01031531532

Last Alpha QC Background: 0.0
Last Beta QC Background: 36.0

Alpha Background Upper Limit (cpm): 3
Alpha Background Lower Limit (cpm): 0
Beta Background Upper Limit (cpm): 80
Beta Background Lower Limit (cpm): 0

Next Sample Number: 0014
User-defined Comment: TEST
Logging Mode: Log QC Only
Recycle Mode: OFF
Printer Mode: OFF

GRIFFIN INSTRUMENTS

CALIBRATION CERTIFICATE FOR 43-10-1 PROBE # PR255979

Owner: PHILOTECHNICS

DATE: 08/06/10 LOCATION: Griffin Inst

TECH: Joanne Glenn DATE LAST CAL EXPIRES: 06/17/10

REASON FOR CALIBRATION:

(•) Due For Calibration ( ) Repair (See Remarks) ( ) Other (See Remarks) ( ) Due and Repair

CABLE LENGTH: 39" INPUT SENSITIVITY: dual

NIST TRACEABLE EQUIPMENT AND STANDARDS USED DURING CALIBRATION

MODEL: 3030E SERIAL #: 242683 CAL. DUE: 08/06/11

NIST TRACEABLE SOURCES USED

Source Number	Isotope	4 pi Activity	Assay Date	2 pi Activity
00TC470-0654	Tc99 SS	17,300 dpm	06/15/09	10,800 cpm
94TH470-1593	Th230	16,700 dpm	06/16/09	8,170 cpm
2696-00	Pu239	18,500 dpm	12/02/09	9,370 cpm
2697-00	Sr90	12,200 dpm	03/01/00	8,530 cpm
PX 726	C14	48,780 dpm	01/21/08	18,660 cpm

Condition: (•) Sat ( ) Unsat

Efficiencies from last cal.:

Pu: 39.49% Th: 31.55% Sr: 46.56%

Tc ss: 22.18% C14: 10.85% Tc Ni:

As Found (AF) Efficiencies:

HV / Vernier:	Tc-99 Source Response Nickel (CPM):			Pu-239 Source Response (CPM):			Background (CPM):		Tc-99 Source Response Stainless Steel (CPM):		
	A ch.	B ch.	Net Eff.	A ch.	B ch.	Net Eff.	A ch.	B ch.	A ch.	B ch.	Net Eff.
625 / N/A				7197	238	38.89%	2	48	0	4790	27.41%

Net A to B Xtalk: <10%	B to A Xtalk: <1%
2.6%	<1%

	Pu239	Tc99 Ni	Tc99 ss	Th-230	Sr90	C-14
AF CPM:	7197		4790	6019	4313	5948
AF 4 pi eff:	38.89%		27.41%	36.03%	44.93%	12.10%
AF 2 pi eff:	*76.79%*		*43.91%*	*73.65%*	*64.25%*	*31.62%*

Is as found efficiency within 20% of the efficiency from the last cal? (•) Yes ( ) No (See Remarks)

Note: If the as found data is within 10% of the last calibration and the B-A Xtalk is <1% and the A-B Xtalk is <10%, then the technician may N/A the plateau section and go directly to remarks.

Ludlum Measurements,Inc.
Model 3030 Plateau Data

8/6/2010
9:39:17 AM

Header 1: Philotechnics
Header 2: Serial#242683
Header 3: Probe#255979
Header 4:
Header 5: More Comments?
Header 6: More Comments?

Calibration Due Date: 8/6/2011

Model 3030 Date: 8/6/2011
Model 3030 Time: 8:04:00 AM

User PC Time: 1.0

Alpha Isotope: Pu239, 2696-00, 12/2/09
Alpha Source Size (dpm): 18500
Alpha Source Size (µCi): 0.008333333

Beta Isotope: Tc99, 00TC470-0654, 6/15/09
Beta Source Size (dpm): 17300
Beta Source Size (µCi): 0.007792793

Starting High Voltage: 575
Starting High Voltage: 675
High Voltage Increment: 25

Plateau Count Mode: SCALER
Source Count Time (min): 0001.0
Background Count Time (min): 1.0

	ALPHA					BETA				
HV	Source (Beta)		Background	Eff	CrossTalk	Source (Alpha)		Background	Eff	Crosstalk
575	7045	(208)	0	38.1%	2.4%	3652	(0)	39	20.9%	0.0%
600	7180	(179)	0	38.8%	2.0%	4236	(1)	37	24.3%	0.0%
625	7197	(238)	2	38.9%	2.6%	4790	(0)	48	27.4%	0.0%
650	7331	(231)	2	39.6%	2.5%	5096	(0)	51	29.2%	0.0%
675	7265	(264)	2	39.3%	3.0%	5284	(1)	49	30.3%	0.0%

GRIFFIN INSTRUMENTS

CALIBRATION CERTIFICATE FOR 2350-1 SERIAL# 212233

Owner: PHILOTECHNICS

DATE: 09/07/10 LOCATION: Griffin Inst

TECH: Joanne Glenn DATE LAST CAL EXPIRES: 09/18/10

Reason For Calibration: (•) Due For Calibration ( ) Repair (See Remarks) ( ) Other (See Remarks) ( ) Due and Repair (See Remarks)

NIST TRACEABLE EQUIPMENT USED DURING CALIBRATION

MODEL: M-500 SERIAL #: 114512 CAL. DUE: 07/28/11

MODEL: SERIAL #: CAL DUE:

[x] Audio Response CABLE LENGTH 5'

CONDITION: Sat

NEW BATTERIES: ( ) Yes (•) No BATTERY CHECK: 5.6 V

HV (+/-10%)	AS FOUND HV	AS LEFT HV
500 V:	495	A.F.
1250 V:	1250	A.F.
2000 V:	1990	A.F.

AF Threshold: 350 AL Threshold : A.F.

RATE CPM	AS FOUND		% ERROR	AS LEFT	% ERROR
250	249		0.4%	A.F.	
2500	2496		0.2%	A.F.	
25K	24.953	K	0.2%	A.F.	
250K	249.491	K	0.2%	A.F.	

Is the As Found Data Within 2% of the Set Point?: (•) Yes ( ) No

	AF	AL		AF	AL
Detector #:	00	A.F.	HV:	950	A.F.
Detector Serial #:	K109	A.F.	Window:	Off	A.F.
Model #:	BP-19DD	A.F.	Count Time (sec):	60	A.F.
U:	7	A.F.	Threshold:	350	A.F.
M:	0	A.F.	Correction Constant:	1	A.F.
TB:	1	A.F.	Dead Time (uSec):	0.0	A.F.

REMARKS:

Does Instrument Meet Final Acceptance Criteria?: (•) Yes ( ) No

Calibration Sticker Attached?: (•) Yes ( ) No

Date Instrument is Due For Next Calibration: 09/07/11

INSTRUMENT MARRIED WITH IBP19DD # K109

Performed/Reviewed by: Joanne Glenn Date: 9/7/2010 Entered by: ____ Initials

Calibrations performed to ANSI N323A-1997 standards.

Serial #	212233		
Detector #	00	01	02
Det Ser #	K109	PR142542	PR142542
Model	BP19DD	43-68 Alpha	43-68 Beta
U	7	7	7
M	0	0	0
TB	1	1	1
HV	950	1250	1700
W (Window)	Off	Off	Off
CT (Count Time)	60 sec	60 sec	60 sec
T (Threshold)	350	40	40
CC	1	1	1
DT	0.0 usec	0.0 usec	0.0 usec

GRIFFIN INSTRUMENTS

CALIBRATION CERTIFICATE FOR IBP19DD PROBE # K109

Owner: PHILOTECHNICS

DATE: 09/07/10 **LOCATION:** Griffin Inst

TECH: Joanne Glenn **DATE LAST CAL EXPIRES:** 09/18/10

REASON FOR CALIBRATION:

(•) Due For Calibration ( ) Repair (See Remarks) ( ) Other (See Remarks) ( ) Due and Repair

CABLE LENGTH: 5' **INPUT SENSITIVITY:** 35 mV

NIST TRACEABLE EQUIPMENT AND STANDARDS USED DURING CALIBRATION

MODEL: 2350-1 **SERIAL #:** 212233 **CAL. DUE:** 09/07/11

NIST TRACEABLE SOURCES USED

Source Number	Isotope	4 pi Activity	Assay Date	2 pi Activity
00TC470-0654	Tc99 SS	17,300 dpm	06/15/09	10,800 cpm
2697-00	Sr90	12,200 dpm	03/01/00	8,530 cpm
PX 726	C14	48,780 dpm	01/21/08	18,660 cpm

Condition: (•) Sat ( ) Unsat

Efficiencies from last cal.:

Pu:		Th:		Sr:	39.47%
Tc ss:	16.43%	C14:	7.95%	Tc Ni:	

As Found (AF) Efficiencies:

HV / Vernier:	Tc-99 Source Response Nickel (CPM):			Pu-239 Source Response (CPM):			Background (CPM):		Tc-99 Source Response Stainless Steel (CPM):		
	A ch.	B ch.	Net Eff.	A ch.	B ch.	Net Eff.	A ch.	B ch.	A ch.	B ch.	Net Eff.
9590 / N/A								398		4062	21.18%

Net A to B Xtalk: <10%	B to A Xtalk: <1%

	Pu239	Tc99 Ni	Tc99 ss	Th-230	Sr90	C-14
AF CPM:			4062		4209	4392
AF 4 pi eff:			21.18%		40.22%	8.19%
AF 2 pi eff:			*33.93%*		*57.53%*	*21.40%*

Is as found efficiency within 20% of the efficiency from the last cal? ( ) Yes (•) No (See Remarks)

Note: If the as found data is within 10% of the last calibration and the B-A Xtalk is <1% and the A-B Xtalk is <10%, then the technician may N/A the plateau section and go directly to remarks.

GRIFFIN INSTRUMENTS

PROBE #: K109
Date: 09/07/10

PLATEAU AND SET POINT DATA

HV / Vernier:	Tc-99 Source Response SS (CPM):			Pu-239 Source Response (CPM):			Background (CPM):		Net A to B Xtalk: <10%	B to A Xtalk: <1%
	A ch.	B ch.	Net Eff.	A ch.	B ch.	Net Eff.	A ch.	B ch.		
850		2142	11.5%					157		
900		3221	17.1%					261		
950		4106	21.6%					364		
1000								727		

Alpha / Beta Bkg (cpm) 430

HV / Vernier		Pu-239	Tc-99 NI	Tc-99 SS	Th-230	C-14	Sr-90
950 / N/A	CPM:			3910		4438	4110
	4 pi AL Efficiencies:			**20.12%**		**8.22%**	**38.84%**
	2 pi AL Efficiencies:			***32.22%***		***21.48%***	***55.55%***

REMARKS: Higher Tc efficiency could be due to thinner mylar sheet.

Does Instrument Meet Final Acceptance Criteria?: (•) Yes ( ) No

Calibration Sticker Attached?: (•) Yes ( ) No

Date Instrument is Due For Next Calibration: **09/07/11**

INSTRUMENT MARRIED WITH **2350-1** **# 212233**

Performed/Reviewed by: Joanne Glenn **Date:** 9/7/2010 **Entered by:** _____ **initials**

2 pi efficiencies denoted in italics.

Calibrations performed to ANSI N323A-1997 standards.

GRIFFIN INSTRUMENTS

CALIBRATION CERTIFICATE FOR 43-68 PROBE # PR142542

01792

Owner: PHILOTECHNICS

DATE: 09/07/10 LOCATION: Griffin Inst

TECH: Joanne Glenn DATE LAST CAL EXPIRES: 09/18/10

REASON FOR CALIBRATION:

(●) Due For Calibration ( ) Repair (See Remarks) ( ) Other (See Remarks) ( ) Due and Repair

CABLE LENGTH: 5' INPUT SENSITIVITY: 4 mV

NIST TRACEABLE EQUIPMENT AND STANDARDS USED DURING CALIBRATION

MODEL: 2350-1 SERIAL #: 212233 CAL. DUE: 09/07/11

NIST TRACEABLE SOURCES USED

Source Number	Isotope	4 pi Activity	Assay Date	2 pi Activity
00TC470-0654	Tc99 SS	17,300 dpm	06/15/09	10,800 cpm
94TH470-1593	Th230	16,700 dpm	06/16/09	8,170 cpm
2696-00	Pu239	18,500 dpm	12/02/09	9,370 cpm
2697-00	Sr90	12,200 dpm	03/01/00	8,530 cpm
PX 726	C14	48,780 dpm	01/21/08	18,660 cpm

Condition: (●) Sat ( ) Unsat

Efficiencies from last cal.:

Pu: | Th: 23.05% | Sr:

Tc ss: 27.33% | C14: 14.67% | Tc Ni:

As Found (AF) Efficiencies:

HV / Vernier:	Tc-99 Source Response Nickel (CPM):			Pu-239 Source Response (CPM):			Background (CPM):		Tc-99 Source Response Stainless Steel (CPM):		
	A ch.	B ch.	Net Eff.	A ch.	B ch.	Net Eff.	A ch.	B ch.	A ch.	B ch.	Net Eff.
1250 a / 1700 b				4483		24.22%	3	606		5421	27.83%

Net A to B Xtalk: <10%	B to A Xtalk: <1%

	Pu239	Tc99 Ni	Tc99 ss	Th-230	Sr90	C-14
AF CPM:	4483		5421	3776	5390	7856
AF 4 pi eff:	24.22%		27.83%	22.59%	50.49%	14.86%
AF 2 pi eff:	*47.81%*		*44.58%*	*46.18%*	*72.22%*	*38.85%*

Is as found efficiency within 20% of the efficiency from the last cal? (●) Yes ( ) No (See Remarks)

Note: If the as found data is within 10% of the last calibration and the B-A Xtalk is <1% and the A-B Xtalk is <10%, then the technician may N/A the plateau section and go directly to remarks.

GRIFFIN INSTRUMENTS

PROBE #: PR142542
Date: 09/07/10

PLATEAU AND SET POINT DATA

HV / Vernier:	Tc-99 Source Response SS (CPM):			Pu-239 Source Response (CPM):			Background (CPM):		Net A to B Xtalk: <10%	B to A Xtalk: <1%
	A ch.	B ch.	Net Eff.	A ch.	B ch.	Net Eff.	A ch.	B ch.		
N/A										

Alpha / Beta Bkg (cpm) 3 306

HV / Vernier		Pu-239	Tc-99 Ni	Tc-99 SS	Th-230	C-14	Sr-90
1250 a / 1700 b	CPM:	4483		5157	3776	7514	4210
	4 pi AL Efficiencies:	**24.22%**		**28.04%**	**22.59%**	**14.78%**	**41.21%**
	2 pi AL Efficiencies:	***47.71%***		***44.92%***	***46.18%***	***38.63%***	***58.93%***

REMARKS: Clean screen and mylar due to as found high beta background.

Does Instrument Meet Final Acceptance Criteria?: (•) Yes ( ) No

Calibration Sticker Attached?: (•) Yes ( ) No

Date Instrument is Due For Next Calibration: **09/07/11**

INSTRUMENT MARRIED WITH **2350-1** **# 212233**

Performed/Reviewed by: Joanne Glenn **Date:** 9/7/2010 **Entered by:** ____ **Initials**

2 pi efficiencies denoted in italics. **Calibrations performed to ANSI N323A-1997 standards.**

GRIFFIN INSTRUMENTS

CALIBRATION CERTIFICATE FOR 2350-1 SERIAL# 203439

Owner: PHILOTECHNICS

DATE: 09/07/10 LOCATION: Griffin Inst

TECH: Joanne Glenn DATE LAST CAL EXPIRES: 09/02/10

Reason For Calibration: (●) Due For Calibration ( ) Repair (See Remarks) ( ) Other (See Remarks) ( ) Due and Repair (See Remarks)

NIST TRACEABLE EQUIPMENT USED DURING CALIBRATION

MODEL: M-500 SERIAL #: 114512 CAL. DUE: 07/28/11

MODEL: SERIAL #: CAL DUE:

☑ Audio Response CABLE LENGTH 5'

CONDITION: Sat

NEW BATTERIES: (●) Yes ( ) No BATTERY CHECK: Sat

HV (+/-10%)	AS FOUND HV	AS LEFT HV
500 V:	495	500
1250 V:	1225	1250
2000 V:	1975	2000

AF Threshold: 350 AL Threshold : A.F.

RATE CPM	AS FOUND		% ERROR	AS LEFT	% ERROR
250	249		0.4%	A.F.	
2500	2498		0.1%	A.F.	
25K	24.983	K	0.1%	A.F.	
250K	249.868	K	0.1%	A.F.	

Is the As Found Data Within 2% of the Set Point?: (●) Yes ( ) No

	AF	AL		AF	AL
Detector #:	00	A.F.	HV:	850	975
Detector Serial #:	351	A.F.	Window:	Off	A.F.
Model #:	BP19DD	A.F.	Count Time (sec):	30	60
U:	7	A.F.	Threshold:	350	A.F.
M:	0	A.F.	Correction Constant:	1	A.F.
TB:	1	A.F.	Dead Time (uSec):	0.0	A.F.

REMARKS:

Does Instrument Meet Final Acceptance Criteria?: (●) Yes ( ) No

Calibration Sticker Attached?: (●) Yes ( ) No

Date Instrument is Due For Next Calibration: 09/07/11

INSTRUMENT MARRIED WITH BP19DD # 351

Performed/Reviewed by: Joanne Glenn Date: 9/7/2010 Entered by: ____ Initials

Calibrations performed to ANSI N323A-1997 standards.

GRIFFIN INSTRUMENTS

CALIBRATION CERTIFICATE FOR BP19DD PROBE # 351

Owner: PHILOTECHNICS

DATE: 09/07/10 **LOCATION:** Griffin Inst
TECH: Joanne Glenn **DATE LAST CAL EXPIRES:** 09/02/10

REASON FOR CALIBRATION:

(●) Due For Calibration ( ) Repair (See Remarks) ( ) Other (See Remarks) ( ) Due and Repair

CABLE LENGTH: 5' **INPUT SENSITIVITY:** 35 mV

NIST TRACEABLE EQUIPMENT AND STANDARDS USED DURING CALIBRATION

MODEL: 2350-1 **SERIAL #:** 203439 **CAL. DUE:** 09/07/11

NIST TRACEABLE SOURCES USED

Source Number	Isotope	4 pi Activity	Assay Date	2 pi Activity
00TC470-0654	Tc99 SS	17,300 dpm	06/15/09	10,600 cpm
2697-00	Sr90	12,200 dpm	03/01/00	8,530 cpm
PX 726	C14	48,780 dpm	01/21/08	18,660 cpm

Condition: (●) Sat ( ) Unsat

Efficiencies from last cal.:

Pu:		Th:		Sr:	34.39%
Tc ss:	16.91%	C14:	5.39%	Tc Ni:	

As Found (AF) Efficiencies:

HV / Vernier:	Tc-99 Source Response Nickel (CPM):			Pu-239 Source Response (CPM):			Background (CPM):		Tc-99 Source Response Stainless Steel (CPM):		
	A ch.	B ch.	Net Eff.	A ch.	B ch.	Net Eff.	A ch.	B ch.	A ch.	B ch.	Net Eff.
850 / N/A								264		2908	15.28%

Net A to B Xtalk: <10%	B to A Xtalk: <1%

	Pu239	Tc99 Ni	Tc99 ss	Th-230	Sr90	C-14
AF CPM:			2908		3510	2070
AF 4 pi eff:			15.28%		34.26%	3.70%
AF 2 pi eff:			*24.48%*		*49.00%*	*9.68%*

Is as found efficiency within 20% of the efficiency from the last cal? ( ) Yes (●) No (See Remarks)

Note: If the as found data is within 10% of the last calibration and the B-A Xtalk is <1% and the A-B Xtalk is <10%, then the technician may N/A the plateau section and go directly to remarks.

GRIFFIN INSTRUMENTS

PROBE #: 351
Date: 09/07/10

PLATEAU AND SET POINT DATA

HV / Vernier:	Tc-99 Source Response SS (CPM):			Pu-239 Source Response (CPM):			Background (CPM):		Net A to B Xtalk: <10%	B to A Xtalk: <1%
	A ch.	B ch.	Net Eff.	A ch.	B ch.	Net Eff.	A ch.	B ch.		
850		2814	14.8%					262		
900		3244	17.1%					282		
950		3598	18.3%					433		
975		3890	19.2%					560		
1000								718		

Alpha / Beta Bkg (cpm) 560

HV / Vernier		Pu-239	Tc-99 Ni	Tc-99 SS	Th-230	C-14	Sr-90
975 / N/A	CPM:			3890		3854	4054
4 pi AL Efficiencies:				**19.25%**		**6.75%**	**36.88%**
2 pi AL Efficiencies:				***30.83%***		***17.65%***	***52.74%***

REMARKS: Probe fell off plateau. Cleaned film off mylar.

Does Instrument Meet Final Acceptance Criteria?: (•) Yes ( ) No

Calibration Sticker Attached?: (•) Yes ( ) No

Date Instrument is Due For Next Calibration: **09/07/11**

INSTRUMENT MARRIED WITH **2350-1** **# 203439**

Performed/Reviewed by: Jeanne Glenn **Date:** 9/7/2010 **Entered by:** ____ **Initials**

2 pi efficiencies denoted in Italics.

Calibrations performed to ANSI N323A-1997 standards.

Duratek

CALIBRATION CERTIFICATE

Duratek Instrument Services
628 Gallaher Road
Kingston, TN 37763
Phone: (865) 376-8337
Fax: (865) 376-8331

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION		INSTRUMENT INFORMATION	
Customer Name: Philotechnics Ltd.		Manufacturer: Ludlum	
Address: 201 Renovare Blvd. Oak Ridge, TN 37830		Model: 2350-1	Serial Number: 203447
Contact Name: Justin Button		Probe: N/A	Serial Number: N/A
Customer Purchase Order Number: Credit Card	Work Order Number: 2010-10806	Calibration Method: Electronic	

INSTRUMENT CALIBRATION INFORMATION

Instrument Range (CPM)	Calibration Standard Value (CPM)	Instrument Response (±10%)		Comments	
		Before Calibration	After Calibration	Calibrated in accordance with CP-IN-WI-239	
400	400	399	399	Pulser: 120935	Cal Due: 08/30/10
4,000	4,000	3,988	3,988	DVM: 88020324	Cal Due: 11/12/10
40,000	40,000	39,884	39,884	D-812: 2816	Cal Due: 09/02/10
400,000	400,000	398,733	398,733	Humidity: 992290	Cal Due: 02/17/11
HV Cal Values (M2350 HV Entry)	Desired HV Tolerance (Voltmeter) (VDC)	As Found (VDC)	As Left (VDC)	EPPROM Version: 37122N28	
500	(490-510)	502	497	Temp: 21.8°C	
1,500	(1,498-1,502)	1,513	1,500	Pressure: 743 mmHg	
2,000	(1,940-2,060)	2,014	1,997	Humidity: 41%	
Parameter	Tolerance (±10%)	As Found	As Left		
Threshold T = 100	10 ± (9 to 11) mVDC	9.9	9.9	Geotropism: SAT	ACK/Scroll: SAT
Threshold T = 500	50 ± (45 to 55) mVDC	46.5	46.5	BAT>4.5: SAT	Volume: SAT
Threshold T =1000	100 ± (90 to 110) mVDC	91	91	Count: SAT	Audio Divide: SAT
Window Width W = 100	10 ± (9 to 11) mVDC	10	10	Alarms: SAT	Lamp: SAT
Display-to-mV ratio:	100 to 10 mV			Overload Test: SAT	Physical Cond: SAT

STATEMENT OF CERTIFICATION

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument Calibrated By: M. Pardi	Reviewed By: Jeff DiLanzo	Date: 7/1/10	
Calibration Date: 07/01/2010		Certification Due: 07/01/2011	

Duratek

CALIBRATION CERTIFICATE

Duratek Instrument Services
628 Gallaher Road
Kingston, TN 37763
Phone: (865) 376-8337
Fax: (865) 376-8331

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION		DETECTOR INFORMATION	
Customer Name: Philotechnics Ltd.		Manufacturer: NE Technology	
Address: 201 Renovare Blvd. Oak Ridge, TN 37830		Model: GP13A	Serial Number: 333
Contact Name: Justin Button		Calibration Method: Source	
Contract Purchase Order Number: Credit Card	Work Order Number: 2010-10806		

DETECTOR PARAMETER SETUPS

Parameter	As Found	As Left	Parameter	As Found	As Left	Comments	
Model	N/A	GP13A	CC	1.0	1.0	DVM: 88020324	Cal Due: 11/12/10
S/N	N/A	333	DT	0uSec	4uSec	D-812: 2816	Cal Due: 09/02/10
Units	7=counts	7=counts	Threshold	100=10mv	350=35mv	Humidity: 992290	Cal Due: 02/17/11
multiplier	0=auto	0=auto					
Time base	1=minutes	1=minutes				Temp: 21.8 °C	Pressure: 743 mmHg
HV	N/A	820V				Humidity: 41%	
Count time	10sec	60sec				**Detector specific parameters must be entered into instrument manually to be used with another 2350-1**	
Saved as Detector #1							

INSTRUMENT INFORMATION

Model	Serial Number	Calibration Due Date
2350-1	203447	07/01/2011

USED FOR EFFICIENCY DETERMINATION AND HV PLATEAUING

I^{129} #040202 at 95,682 DPM Certification Date: 04/13/99

Background (CPM)	Gross Source Counts (CPM)	Net Source Counts (CPM)	Efficiency in % (Determined on contact)
4,679	17,576	12,897	13.5% for I^{129}

Gross source counts taken from an average of three one minute counts from the Heel, Middle, and Toe of Detector

COMMENTS

Detectors set up with a 2350-1 may be used with any 2350-1 provided that the setup parameters are scanned into the 2350-1 prior to use with that specific detector and the threshold ratio is 100=10mV on the instrument

STATEMENT OF CERTIFICATION

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument Calibrated By: M. Pauli Reviewed By: J. M. Dalonzo Date: 7/1/10

Calibration Date: 07/01/2010 Calibration Due: 07/01/2011

NE Technology GP13A HIGH VOLTAGE PLATEAU DATA SHEET

Serial Number: 333

HIGH VOLTAGE	BACKGROUND (CPM)	SOURCE (CPM)
740	4,639	9,604
760	4,758	15,299
780	4,534	17,655
800	4,417	17,163
820 (SET)	**4,621**	**17,682**
840	4,648	17,965
860	4,831	18,341
880	4,833	18,431
900	4,882	18,153
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A

Plateau performed with I^{129} Source # 040202 at 95,682 dpm at center of detector

Performed By: M. Pauli **Date:** 7-1-10

Duratek™

CALIBRATION CERTIFICATE

Duratek Instrument Services
628 Gallaher Road
Kingston, TN 37763
Phone: (865) 376-8337
Fax: (865) 376-8331

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION		INSTRUMENT INFORMATION	
Customer Name: Philotechnics Ltd.		Manufacturer: Ludlum	
Address: 201 Renovare Blvd. Oak Ridge, TN 37830		Model: 2350-1	Serial Number: 246986
Contact Name: Justin Button		Probe: N/A	Serial Number: N/A
Customer Purchase Order Number: Credit Card	Work Order Number: 2010-10806	Calibration Method: Electronic	

INSTRUMENT CALIBRATION INFORMATION

Instrument Range (CPM)	Calibration Standard Value (CPM)	Instrument Response (±10%)		Comments	
		Before Calibration	After Calibration	Calibrated in accordance with CP-IN-WI-239	
400	400	402	402	Pulser: 120935	Cal Due: 08/30/10
4,000	4,000	3,994	3,994	DVM: 88020324	Cal Due: 11/12/10
40,000	40,000	39,929	39,929	D-812: 2816	Cal Due: 09/02/10
400,000	400,000	399,167	399,167	Humidity: 992290	Cal Due: 02/17/11
HV Cal Values (M2350 HV Entry)	Desired HV Tolerance (Voltmeter) (VDC)	As Found (VDC)	As Left (VDC)	EPPROM Version: 37122N28	
500	(490-510)	503	500	Temp: 21.8°C	
1,500	(1,498-1,502)	1,514	1,500	Pressure: 743 mmHg	
2,000	(1,940-2,060)	2,016	1,998	Humidity: 41%	
Parameter	Tolerance (±10%)	As Found	As Left		
Threshold T = 100	10 ± (9 to 11) mVDC	10.2	10.2	Geotropism: SAT	ACK/Scroll: SAT
Threshold T = 500	50 ± (45 to 55) mVDC	48.7	48.7	BAT>4.5: SAT	Volume: SAT
Threshold T =1000	100 ± (90 to 110) mVDC	97	97	Count: SAT	Audio Divide: SAT
Window Width W = 100	10 ± (9 to 11) mVDC	10	10	Alarms: SAT	Lamp: SAT
Display-to-mV ratio:	100 to 10 mV			Overload Test: SAT	Physical Cond: SAT

STATEMENT OF CERTIFICATION

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument Calibrated By: M. Paul	Reviewed By: Jeff Dubois	Date: 7/1/10
Calibration Date: 07/01/2010	Certification Due: 07/01/2011	

Duratek™

CALIBRATION CERTIFICATE

Duratek Instrument Services
628 Gallaher Road
Kingston, TN 37763
Phone: (865) 376-8337
Fax: (865) 376-8331

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION		DETECTOR INFORMATION	
Customer Name: Philotechnics Ltd.		Manufacturer: NE Technology	
Address: 201 Renovare Blvd. Oak Ridge, TN 37830		Model: GP13A	Serial Number: 334
Contact Name: Justin Button		Calibration Method: Source	
Contract Purchase Order Number: Credit Card	Work Order Number: 2010-10806		

DETECTOR PARAMETER SETUPS

Parameter	As Found	As Left	Parameter	As Found	As Left	Comments	
Model	GP13A	GP13A	CC	1.0	1.0	DVM: 88020324	Cal Due: 11/12/10
S/N	334	334	DT	0uSec	4uSec	D-812: 2816	Cal Due: 09/02/10
Units	7=counts	7=counts	Threshold	350=35mv	350=35mv	Humidity: 992290	Cal Due: 02/17/11
multiplier	0=auto	0=auto					
Time base	1=minutes	1=minutes				Temp: 21.8 °C	Pressure: 743 mmHg
HV	1240V	1140V				Humidity: 41%	
Count time	60sec	60sec				**Detector specific parameters must be entered into instrument manually to be used with another 2350-1**	
Saved as Detector #1							

INSTRUMENT INFORMATION

Model	Serial Number	Calibration Due Date
2350-1	246986	07/01/2011

USED FOR EFFICIENCY DETERMINATION AND HV PLATEAUING

I^{129} #040202 at 95,682 DPM Certification Date: 04/13/99

Background (CPM)	Gross Source Counts (CPM)	Net Source Counts (CPM)	Efficiency in % (Determined on contact)
5,658	17,784	12,126	12.7% for I^{129}

****Gross source counts taken from an average of three one minute counts from the Heel, Middle, and Toe of Detector****

COMMENTS

****Detectors set up with a 2350-1 may be used with any 2350-1 provided that the setup parameters are scanned into the 2350-1 prior to use with that specific detector and the threshold ratio is 100=10mV on the instrument****

STATEMENT OF CERTIFICATION

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument Calibrated By: M. Paul	Reviewed By:	Date: 7/1/10
Calibration Date: 07/01/2010		Calibration Due: 07/01/2011

NE Technology GP13A HIGH VOLTAGE PLATEAU DATA SHEET

Serial Number: 334 .

HIGH VOLTAGE	BACKGROUND (CPM)	SOURCE (CPM)
1020	3,552	12,593
1040	3,643	14,351
1060	3,970	15,646
1080	4,151	16,635
1100	4,211	17,112
1120	4,466	17,942
1140 (SET)	**4,712**	**18,261**
1160	5,018	20,514
1180	8,190	22,155
1200	9,424	20,638
1220	6,901	21,361
1240	7,715	24,226
1260	9,992	26,438
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A

Plateau performed with I^{129} Source # 040202 at 95,682 dpm at center of detector

Performed By: M. Paul **Date:** 7-1-10 .

APPENDIX D

MARSSIM Analytical Calculation Sheets

Philotechnics
Analytical Worksheet

Minimum Detectable Concentration (MDC) Static Count Calculations for Liquid Scintillation Counter
(95% confidence level via NUREG 1507 method)

$$MDC\,(dpm/100cm^2) = \frac{3 + 3.29\sqrt{(R_b)(T_{s+b})(1 + T_{s+b}/T_b)}}{(Eff.)(T_{s+b})} \qquad \text{(Eq. 1)}$$

Where:

Eff. = LSC total efficiency, Counter cpm/NIST Standard dpm
R_b = LSC background rate (cpm)
T_{s+b} = Sample count time (minutes)
T_b = Background count time (minutes)

Static Count MDC Calculations					
Nuclide	**Eff.**	**R_b**	**T_{s+b}**	**T_b**	**MDC (Static)**
H-3	62.8%	15.5	1	1	**33.9** dpm/100 cm^2
C-14	96.8%	9.5	1	1	**17.9** dpm/100 cm^2

Minimum Detectable Concentration (MDC) Static Count Calculations for Planchet Counter
(95% confidence level via NUREG 1507 method)

$$MDC\,(dpm/100cm^2) = \frac{3 + 3.29\sqrt{(R_b)(T_{s+b})(1 + T_{s+b}/T_b)}}{(Eff.)(T_{s+b})} \qquad \text{(Eq. 1)}$$

Where:

Eff. = Planchet total efficiency {4π efficiency}
R_b = Planchet background rate (cpm)
T_{s+b} = Sample count time (minutes)
T_b = Background count time (minutes)

Static Count MDC Calculations						
Ludlum 3030 Meter: 242683 w/43-10-1 Probe						
Meter	**Nuclide**	**Total Eff.**	**R_b**	**T_{s+b}**	**T_b**	**MDC (Static)**
3030	Pu-239	39.49%	0.8	1	1	18.1 dpm/100 cm^2
3030	Sr-90	46.56%	56.4	1	1	81.5 dpm/100 cm^2

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Analytical Worksheet

Minimum Detectable Concentration (MDC) Static Count Calculations for Hand-Held Monitors

(95% confidence level via NUREG 1507 method)

$$MDC\,(dpm/100cm^2) = \frac{3+3.29\sqrt{(R_b)(T_{s+b})(1+T_{s+b}/T_b)}}{(Eff.)(T_{s+b})(probeareacm^2/100cm^2)} \qquad \text{(Eq. 2)}$$

Where:

Total Eff. = Total Efficiency (2pi efficiency * 0.25 per ISO 7503-1)
R_b = Average background rate (cpm)
T_{s+b} = Sample count time (minutes)
T_b = Background count time (minutes)
P = Probe area (cm2)

Static Count MDC Calculations

Meter: 212233 w/BP19DD Probe (Hand Held Beta)

Nuclide	Total Eff.	R_b	T_{s+b}	T_b	P	MDC (Static)	
C-14	5.37%	337.2	1	1	100	**1646.9** dpm/100 cm^2	Ambient
C-14	5.37%	327.3	1	1	100	**1623.4** dpm/100 cm^2	Drywall
C-14	5.37%	368.1	1	1	100	**1718.2** dpm/100 cm^2	Floor
C-14	5.37%	322.7	1	1	100	**1612.3** dpm/100 cm^2	Metal

Meter: 203439 w/BP19DD Probe (Hand Held Beta)

Nuclide	Total Eff.	R_b	T_{s+b}	T_b	P	MDC (Static)	
C-14	4.41%	478.3	1	1	100	**2375.4** dpm/100 cm^2	Ambient
C-14	4.41%	482.9	1	1	100	**2386.5** dpm/100 cm^2	Drywall
C-14	4.41%	579.6	1	1	100	**2608.0** dpm/100 cm^2	Floor
C-14	4.41%	431.2	1	1	100	**2258.9** dpm/100 cm^2	Metal

Meter: 212233 w/43-68 Probe (Hand Held Alpha)

Nuclide	Total Eff.	R_b	T_{s+b}	T_b	P	MDC (Static)	
Pu-239	12.43%	0.4	1	1	100	**47.8** dpm/100 cm^2	Ambient
Pu-239	12.43%	0.8	1	1	100	**57.6** dpm/100 cm^2	Drywall
Pu-239	12.43%	1.0	1	1	100	**61.6** dpm/100 cm^2	Floor
Pu-239	12.43%	0.6	1	1	100	**53.1** dpm/100 cm^2	Metal

Meter: 203447 w/GP13A Probe (Hand Held Gamma)

Nuclide	Total Eff.	R_b	T_{s+b}	T_b	P	MDC (Static)	
I-125	25.11%	4225.9	1	1	100	**1216.5** dpm/100 cm^2	Ambient
I-125	25.11%	4256.3	1	1	100	**1220.8** dpm/100 cm^2	Dywall
I-125	25.11%	4338.0	1	1	100	**1232.4** dpm/100 cm^2	Floor
I-125	25.11%	2908.0	1	1	100	**1011.2** dpm/100 cm^2	Metal

Meter: 246986 w/GP13A Probe (Hand Held Gamma)

Nuclide	Total Eff.	R_b	T_{s+b}	T_b	P	MDC (Static)	
I-125	23.62%	3965.6	1	1	100	**1253.2** dpm/100 cm^2	Ambient
I-125	23.62%	4340.1	1	1	100	**1310.4** dpm/100 cm^2	Dywall
I-125	23.62%	4743.9	1	1	100	**1369.4** dpm/100 cm^2	Floor
I-125	23.62%	3658.1	1	1	100	**1204.1** dpm/100 cm^2	Metal

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Analytical Worksheet

Scan Minimum Detectable Concentration (MDC)
Calculations for Hand-Held Monitors
(Scan MDA per NUREG-1575, NUREG-1507 methodology)

$$Scan\,MDC = \frac{MDCR}{\sqrt{p}\,(\varepsilon_i)(\varepsilon_s)\left(\frac{A}{100cm^2}\right)} \qquad \text{(Eq. 3)}$$

Where:

p = surveyor efficiency, per NUREG 1507 (0.5)
ε_i = total efficiency (2π geometry)
ε_s = surface efficiency, 0.5 for gammas and high energy betas >1 MeV Emax (e.g. P-32, Cl-36, S/Y-90, etc.), 0.25 for low energy betas (e.g. C-14, P-33, S-35, Tc-99, Ca-45, etc.)
A = probe active area (cm^2)

And,

$$MDCR = S_i\,(60\,\text{sec}/\text{min})/i\,\text{sec} \qquad \text{(Eq. 4)}$$

Where:

MDCR = Minimum detectable count rate (cpm)
S_i = source counts in time interval, i.

And,

$$S_i = d'\sqrt{B_i} \qquad \text{(Eq. 5)}$$

Where:

d' = 1.38 for 95% true positive scan detection rate, per, NUREG 1507, Table 6.1
B_i = Background counts in interval, i

And,

$$B_i = (P_b)(i)(1\,\text{min}/60\,\text{sec}) \qquad \text{(Eq. 6)}$$

Where:

P_b = probe background count rate (cpm)
i = observation interval

Philotechnics
Analytical Worksheet

Scan Minimum Detectable Concentration (MDC)
Calculations for Hand-Held Monitors
(Scan MDA per NUREG-1575, NUREG-1507 methodology)

Specific Scan MDC calculation results:

#212233	Ambient	Dywall	Floor	Metal	
P_b =	337.2	327.3	368.1	322.7	cpm
i =	1.34	1.34	1.34	1.34	sec
B_i =	7.53	7.31	8.22	7.21	counts
d' =	1.38	1.38	1.38	1.38	
S_i =	3.79	3.73	3.96	3.70	counts
MDCR =	169.6	167.1	177.2	165.9	cpm

#203439	Ambient	Drywall	Floor	Metal	
P_b =	478.3	482.9	579.6	431.2	cpm
i =	1.34	1.34	1.34	1.34	sec
B_i =	10.68	10.78	12.94	9.63	counts
d' =	1.38	1.38	1.38	1.38	
S_i =	4.51	4.53	4.97	4.28	counts
MDCR =	202.0	202.9	222.3	191.8	cpm

#212233	Ambient	Dywall	Floor	Metal	
P_b =	0.4	0.8	1.0	0.6	cpm
i =	1.34	1.34	1.34	1.34	sec
B_i =	0.01	0.02	0.02	0.01	counts
d' =	1.38	1.38	1.38	1.38	
S_i =	0.13	0.18	0.21	0.16	counts
MDCR =	5.8	8.3	9.2	7.2	cpm

#203447	Ambient	Dywall	Floor	Metal	
P_b =	4225.9	4256.3	4338.0	2908.0	cpm
i =	1.34	1.34	1.34	1.34	sec
B_i =	94.38	95.06	96.88	64.95	counts
d' =	1.38	1.38	1.38	1.38	
S_i =	13.41	13.45	13.58	11.12	counts
MDCR =	600.3	602.4	608.2	498.0	cpm

#246986	Ambient	Dywall	Floor	Metal	
P_b =	3965.6	4340.1	4743.9	3658.1	cpm
i =	1.34	1.34	1.34	1.34	sec
B_i =	88.57	96.93	105.95	81.70	counts
d' =	1.38	1.38	1.38	1.38	
S_i =	12.99	13.59	14.20	12.47	counts
MDCR =	581.5	608.3	636.0	558.5	cpm

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Analytical Worksheet

Scan MDC Calculations				
Meter: 212233 (Hand Held Beta)				
Nuclide	**Total Efficiency**	**Area**	**MDC (Scan)**	
C-14	5.37%	100	**4465.7** dpm/100 cm^2	Ambient
C-14	5.37%	100	**4399.6** dpm/100 cm^2	Drywall
C-14	5.37%	100	**4665.8** dpm/100 cm^2	Floor
C-14	5.37%	100	**4368.6** dpm/100 cm^2	Metal
Meter: 203439 (Hand Held Beta)				
Nuclide	**Total Efficiency**	**Area**	**MDC (Scan)**	
C-14	4.41%	100	**6476.3** dpm/100 cm^2	Ambient
C-14	4.41%	100	**6507.4** dpm/100 cm^2	Drywall
C-14	4.41%	100	**7129.2** dpm/100 cm^2	Floor
C-14	4.41%	100	**6149.2** dpm/100 cm^2	Metal
Meter: 212233 (Hand Held Alpha)				
Nuclide	**Total Efficiency**	**Area**	**MDC (Scan)**	
Pu-239	12.43%	100	**66.4** dpm/100 cm^2	Ambient
Pu-239	12.43%	100	**94.0** dpm/100 cm^2	Drywall
Pu-239	12.43%	100	**105.1** dpm/100 cm^2	Floor
Pu-239	12.43%	100	**81.4** dpm/100 cm^2	Metal

Meter: 203447 (Hand Held Gamma)				
Nuclide	**Total Efficiency**	**Area**	**MDC (Scan)**	
I-125	25.11%	100	**3380.9** dpm/100 cm^2	Ambient
I-125	25.11%	100	**3393.0** dpm/100 cm^2	Drywall
I-125	25.11%	100	**3425.4** dpm/100 cm^2	Floor
I-125	25.11%	100	**2804.6** dpm/100 cm^2	Metal
Meter: 246986 (Hand Held Gamma)				
Nuclide	**Total Efficiency**	**Area**	**MDC (Scan)**	
I-125	23.62%	100	**3481.7** dpm/100 cm^2	Ambient
I-125	23.62%	100	**3642.4** dpm/100 cm^2	Drywall
I-125	23.62%	100	**3808.1** dpm/100 cm^2	Floor
I-125	23.62%	100	**3344.0** dpm/100 cm^2	Metal

APPENDIX E

Background Documentation

Philotechnics Analytical Worksheet

Background Documentation

Fail Levels

Ld, system detection limit is the net count having 95% probability of being detected when a survey sample point contains activity at Ld, which translates to a 5% probability of falsely interpreting sample activity as activity due to background (NUREG-1507 Table 3-8)

$$L_d\,(cpm) = 3 + 4.65\sqrt{B} \qquad \text{(Eq. 7)}$$

Fail Level CPM = Bkg cpm + Ld cpm

Fail Level Calculations (Static) #212233 Beta				
Probe	**Surface**	**Bkg**	**Ld (cpm)**	**Fail Level (cpm)**
BP19DD	Ambient	337.2	88.4	**425.6**
BP19DD	Drywall	327.3	87.1	**414.4**
BP19DD	Floor	368.1	92.2	**460.3**
BP19DD	Metal	322.7	86.5	**409.2**
Fail Level Calculations (Static) #203439 Beta				
Probe	**Surface**	**Bkg**	**Ld (cpm)**	**Fail Level (cpm)**
BP19DD	Ambient	478.3	104.7	**583.0**
BP19DD	Drywall	482.9	105.2	**588.1**
BP19DD	Floor	579.6	114.9	**694.5**
BP19DD	Metal	431.2	99.6	**530.8**

Fail Level Calculations (Static) #212233 Alpha				
Probe	**Surface**	**Bkg**	**Ld (cpm)**	**Fail Level (cpm)**
43-68	Ambient	0.4	5.9	**6.3**
43-68	Drywall	0.8	7.2	**8.0**
43-68	Floor	1.0	7.7	**8.7**
43-68	Metal	0.6	6.6	**7.2**

Fail Level Calculations (Static) #203447 Gamma				
Probe	**Surface**	**Bkg**	**Ld (cpm)**	**Fail Level (cpm)**
GP13A	Ambient	4225.9	305.3	**4531.2**
GP13A	Drywall	4256.3	306.4	**4562.7**
GP13A	Floor	4338.0	309.3	**4647.3**
GP13A	Metal	2908.0	253.8	**3161.8**
Fail Level Calculations (Static) #246986 Gamma				
Probe	**Surface**	**Bkg**	**Ld (cpm)**	**Fail Level (cpm)**
GP13A	Ambient	3965.6	295.8	**4261.4**
GP13A	Drywall	4340.1	309.3	**4649.4**
GP13A	Floor	4743.9	323.3	**5067.2**
GP13A	Metal	3658.1	284.2	**3942.3**

Philotechnics Analytical Worksheet

Background Data

Ludlum 2350-1 with BP19DD probe #212233 (Hand Held Beta Probe)					
Surface	Counts (cpm)				
Ambient	335	346	306	308	356
	346	336	341	343	355
	Average:	**337.2 cpm**			
Surface	Counts (cpm)				
Drywall	345	323	335	326	333
	325	314	302	339	331
	Average:	**327.3 cpm**			
Surface	Counts (cpm)				
Floor	340	399	368	372	358
	374	380	371	366	353
	Average:	**368.1 cpm**			
Surface	Counts (cpm)				
Metal	327	322	353	322	302
	306	316	338	326	315
	Average:	**322.7 cpm**			

Ludlum 2350-1 with BP19DD probe #203439 (Hand Held Beta Probe)					
Surface	Counts (cpm)				
Ambient	452	495	498	458	546
	443	450	469	474	498
	Average:	**478.3 cpm**			
Surface	Counts (cpm)				
Drywall	480	453	459	487	459
	495	517	495	477	507
	Average:	**482.9 cpm**			
Surface	Counts (cpm)				
Floor	592	590	566	581	592
	564	582	573	571	585
	Average:	**579.6 cpm**			
Surface	Counts (cpm)				
Metal	402	421	431	428	441
	436	429	448	437	439
	Average:	**431.2 cpm**			

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Ludlum 2350-1 with 43-68 probe #PR142542 (Hand Held Alpha Probe)					
Surface	Counts (cpm)				
Ambient	0	1	1	0	0
	1	1	0	0	0
	Average:	**0.4 cpm**			
Surface	Counts (cpm)				
Drywall	0	1	1	0	1
	1	0	1	1	2
	Average:	**0.8 cpm**			
Surface	Counts (cpm)				
Floor	2	1	1	1	2
	0	2	1	0	0
	Average:	**1.0 cpm**			
Surface	Counts (cpm)				
Metal	0	1	1	1	1
	1	0	0	0	1
	Average:	**0.6 cpm**			

Ludlum 2350-1 with GP13A probe #203447 (Hand Held Gamma Probe)					
Surface	Counts (cpm)				
Ambient	4226	4123	4215	4123	4198
	4066	4259	4366	4244	4439
	Average:	**4225.9 cpm**			
Surface	Counts (cpm)				
Drywall	4108	4370	4141	4336	4207
	4297	4327	4191	4357	4229
	Average:	**4256.3 cpm**			
Surface	Counts (cpm)				
Floor	4319	4276	4316	4276	4401
	4302	4259	4484	4398	4349
	Average:	**4338.0 cpm**			
Surface	Counts (cpm)				
Metal	2824	2943	2745	2849	3065
	2841	2896	3084	2929	2904
	Average:	**2908.0 cpm**			

Philotechnics Analytical Worksheet

Ludlum 2350-1 with GP13A probe #246986 (Hand Held Gamma Probe)					
Surface	Counts (cpm)				
Ambient	4437	4068	4035	3910	3998
	3698	3951	3878	3857	3824
	Average:	**3965.6 cpm**			
Surface	Counts (cpm)				
Drywall	4518	4501	4400	4143	4315
	4342	4380	4187	4353	4262
	Average:	**4340.1 cpm**			
Surface	Counts (cpm)				
Floor	4725	4722	4754	4693	4812
	4734	4785	4734	4785	4695
	Average:	**4743.9 cpm**			
Surface	Counts (cpm)				
Metal	3430	3728	3608	3634	3690
	3685	3632	3807	3614	3753
	Average:	**3658.1 cpm**			

Planchet Counter 3030 - Serial #242683				
Surface	Counts (cpm)			
Ambient (Alpha)	One 10 minute count		8	
Ambient (Beta)	One 10 minute count		564	
Average:	**Alpha**	**0.8 cpm**	**Beta**	**56.4 cpm**

		Scintillation Counter Counts (cpm)		
Sample	Time	Chan A (cpm)	Chan B (cpm)	Chan C (cpm)
1	1 min.	17	8	48
2	1 min.	22	11	51
3	1 min.	14	8	37
4	1 min.	15	9	35
5	1 min.	17	6	36
6	1 min.	10	14	39
7	1 min.	20	10	45
8	1 min.	14	13	43
9	1 min.	10	7	31
10	1 min.	16	9	41
	Average:	**15.5**	**9.5**	**40.6**

APPENDIX F

Static Measurement Data Sheets and DPM Calculations

Philotechnics Analytical Worksheet

VAPAHCS - Building 2

3801 Miranda Ave. Palo Alto, CA

Static Measurements

Survey Unit 1 Rooms A008, A009, A010		Beta 212233		Gamma 203447	
Surface		**Bkg (CPM)**	**MDC (dpm)**	**Bkg (CPM)**	**MDC (dpm)**
Ambient	A	337.2	1646.9	4225.9	1216.5
Drywall	D	327.3	1623.4	4256.3	1220.8
Floor	F	368.1	1718.2	4338.0	1232.4
Metal	M	322.7	1612.3	2908.0	1011.2
Beta Meter Efficiency		5.37%			
Gamma Meter Efficiency		25.11%			

Sample	Surface	Beta Gross CPM	Beta Net CPM	Beta DPM /100CM2	±	1.96 Sigma	Gamma Gross CPM	Gamma Net CPM	Gamma DPM /100CM2	±	1.96 Sigma	Comment
1	F	350	-18	***-337***	±	36	4159	-179	***-713***	±	52	<DCGL
2	F	341	-27	***-505***	±	44	4386	48	***191***	±	27	<DCGL
3	F	396	28	***520***	±	45	4634	296	***1179***	±	67	<DCGL
4	F	360	-8	***-151***	±	24	4608	270	***1075***	±	64	<DCGL
5	F	352	-16	***-300***	±	34	4396	58	***231***	±	30	<DCGL
6	F	328	-40	***-747***	±	54	4077	-261	***-1039***	±	63	<DCGL
7	D	313	-14	***-266***	±	32	3910	-346	***-1379***	±	73	<DCGL
8	D	324	-3	***-61***	±	15	4227	-29	***-117***	±	21	<DCGL
9	D	313	-14	***-266***	±	32	4449	193	***767***	±	54	<DCGL
10	D	339	12	***218***	±	29	4148	-108	***-431***	±	41	<DCGL
11	D	327	0	***-6***	±	5	4576	320	***1273***	±	70	<DCGL
12	D	345	18	***330***	±	36	4146	-110	***-439***	±	41	<DCGL
13	D	331	4	***69***	±	16	4251	-5	***-21***	±	9	<DCGL
14	D	315	-12	***-229***	±	30	4509	253	***1006***	±	62	<DCGL
15	F	362	-6	***-114***	±	21	4403	65	***259***	±	32	<DCGL
16	F	373	5	***91***	±	19	4209	-129	***-514***	±	44	<DCGL
17	F	365	-3	***-58***	±	15	4161	-177	***-705***	±	52	<DCGL
18	F	364	-4	***-76***	±	17	3957	-381	***-1517***	±	76	<DCGL
19	F	338	-30	***-561***	±	46	4274	-64	***-255***	±	31	<DCGL
20	F	322	-46	***-858***	±	57	4286	-52	***-207***	±	28	<DCGL
21	F	395	27	***501***	±	44	4367	29	***115***	±	21	<DCGL
22	F	386	18	***333***	±	36	4087	-251	***-1000***	±	62	<DCGL
23	D	306	-21	***-397***	±	39	4083	-173	***-690***	±	51	<DCGL
24	D	345	18	***330***	±	36	3969	-287	***-1144***	±	66	<DCGL
25	D	306	-21	***-397***	±	39	4042	-214	***-853***	±	57	<DCGL
26	D	329	2	***32***	±	11	4037	-219	***-873***	±	58	<DCGL
27	D	354	27	***497***	±	44	4001	-255	***-1017***	±	62	<DCGL
28	D	343	16	***292***	±	34	4895	639	***2544***	±	99	<DCGL
29	D	407	80	***1484***	±	76	5236	980	***3902***	±	122	<DCGL
30	D	357	30	***553***	±	46	5173	917	***3651***	±	118	<DCGL
31	D	378	51	***944***	±	60	5148	892	***3551***	±	117	<DCGL
32	D	312	-15	***-285***	±	33	4142	-114	***-455***	±	42	<DCGL
33	A	415	78	***1449***	±	75	3938	-288	***-1147***	±	66	<DCGL

Philotechnics Analytical Worksheet

VAPAHCS - Building 2

3801 Miranda Ave. Palo Alto, CA

Survey Unit 2 Room A05A		Beta 212233		Gamma 203447	
Surface		Bkg (CPM)	MDC (dpm)	Bkg (CPM)	MDC (dpm)
Ambient	A	337.2	1646.9	4225.9	1216.5
Drywall	D	327.3	1623.4	4256.3	1220.8
Floor	F	368.1	1718.2	4338.0	1232.4
Metal	M	322.7	1612.3	2908.0	1011.2
Beta Meter Efficiency		5.37%			
Gamma Meter Efficiency		25.11%			

Sample	Surface	Beta Gross CPM	Beta Net CPM	Beta DPM /100CM2	±	1.96 Sigma	Gamma Gross CPM	Gamma Net CPM	Gamma DPM /100CM2	±	1.96 Sigma	Comment
1	M	341	18	***341***	±	36	3378	470	***1872***	±	85	<DCGL
2	M	368	45	***844***	±	57	4141	1233	***4910***	±	137	<DCGL
3	M	358	35	***657***	±	50	3325	417	***1661***	±	80	<DCGL
4	F	388	20	***371***	±	38	4249	-89	***-354***	±	37	<DCGL
5	F	362	-6	***-114***	±	21	4361	23	***92***	±	19	<DCGL
6	M	313	-10	***-181***	±	26	3187	279	***1111***	±	65	<DCGL
7	M	359	36	***676***	±	51	2542	-366	***-1458***	±	75	<DCGL
8	F	361	-7	***-132***	±	23	3974	-364	***-1450***	±	75	<DCGL
9	F	358	-10	***-188***	±	27	4029	-309	***-1231***	±	69	<DCGL
10	F	388	20	***371***	±	38	4119	-219	***-872***	±	58	<DCGL
11	F	378	10	***184***	±	27	4060	-278	***-1107***	±	65	<DCGL
12	F	351	-17	***-318***	±	35	4181	-157	***-625***	±	49	<DCGL
13	M	301	-22	***-404***	±	39	2941	33	***131***	±	22	<DCGL
14	M	324	1	***24***	±	10	2767	-141	***-562***	±	46	<DCGL
15	F	378	10	***184***	±	27	3450	-888	***-3536***	±	117	<DCGL
16	M	312	-11	***-199***	±	28	3069	161	***641***	±	50	<DCGL
17	M	304	-19	***-348***	±	37	2963	55	***219***	±	29	<DCGL
18	M	298	-25	***-460***	±	42	2631	-277	***-1103***	±	65	<DCGL
19	M	319	-4	***-69***	±	16	3394	486	***1935***	±	86	<DCGL
20	M	293	-30	***-553***	±	46	3671	763	***3039***	±	108	<DCGL
21	M	313	-10	***-181***	±	26	3114	206	***820***	±	56	<DCGL
22	M	312	-11	***-199***	±	28	3340	432	***1720***	±	81	<DCGL
23	M	325	2	***43***	±	13	3676	768	***3059***	±	108	<DCGL
24	M	301	-22	***-404***	±	39	3272	364	***1450***	±	75	<DCGL
25	M	305	-18	***-330***	±	36	2934	26	***104***	±	20	<DCGL
26	M	304	-19	***-348***	±	37	2568	-340	***-1354***	±	72	<DCGL
27	M	314	-9	***-162***	±	25	2414	-494	***-1967***	±	87	<DCGL
28	M	350	27	***508***	±	44	2890	-18	***-72***	±	17	<DCGL
29	M	332	9	***173***	±	26	3612	704	***2804***	±	104	<DCGL
30	M	328	5	***99***	±	19	3538	630	***2509***	±	98	<DCGL
31	M	314	-9	***-162***	±	25	3187	279	***1111***	±	65	<DCGL
32	M	305	-18	***-330***	±	36	2725	-183	***-729***	±	53	<DCGL
33	M	341	18	***341***	±	36	4152	1244	***4954***	±	138	<DCGL
34	M	304	-19	***-348***	±	37	3869	961	***3827***	±	121	<DCGL
35	M	287	-36	***-665***	±	51	2903	-5	***-20***	±	9	<DCGL
36	M	301	-22	***-404***	±	39	2900	-8	***-32***	±	11	<DCGL
37	M	324	1	***24***	±	10	2813	-95	***-378***	±	38	<DCGL
38	M	315	-8	***-143***	±	23	2615	-293	***-1167***	±	67	<DCGL
39	M	319	-4	***-69***	±	16	2716	-192	***-765***	±	54	<DCGL
40	M	316	-7	***-125***	±	22	2463	-445	***-1772***	±	83	<DCGL
41	M	296	-27	***-497***	±	44	3556	648	***2581***	±	100	<DCGL
42	M	325	2	***43***	±	13	2970	62	***247***	±	31	<DCGL
43	M	374	51	***955***	±	61	2643	-265	***-1055***	±	64	<DCGL
44	M	346	23	***434***	±	41	2665	-243	***-968***	±	61	<DCGL
45	M	351	28	***527***	±	45	2701	-207	***-824***	±	56	<DCGL
46	A	346	9	***164***	±	25	3209	-1017	***-4050***	±	125	<DCGL
47	A	331	-6	***-115***	±	21	3140	-1086	***-4325***	±	129	<DCGL

Philotechnics Analytical Worksheet

VAPAHCS - Building 2

3801 Miranda Ave. Palo Alto, CA

Survey Unit 3 Room A05		Beta 203439		Gamma 246986	
Surface		Bkg (CPM)	MDC (dpm)	Bkg (CPM)	MDC (dpm)
Ambient	A	478.3	2375.4	3965.6	1253.2
Drywall	D	482.9	2386.5	4340.1	1310.4
Floor	F	579.6	2608.0	4743.9	1369.4
Metal	M	431.2	2258.9	3658.1	1204.1
Beta Meter Efficiency		4.41%			
Gamma Meter Efficiency		23.62%			

Sample	Surface	Beta Gross CPM	Beta Net CPM	Beta DPM /100CM2	±	1.96 Sigma	Gamma Gross CPM	Gamma Net CPM	Gamma DPM /100CM2	±	1.96 Sigma	Comment
1	F	638	58	***1324***	±	71	4525	-219	***-927***	±	60	<DCGL
2	F	664	84	***1914***	±	86	4305	-439	***-1858***	±	84	<DCGL
3	F	590	10	***236***	±	30	3978	-766	***-3243***	±	112	<DCGL
4	F	503	-77	***-1737***	±	82	4129	-615	***-2603***	±	100	<DCGL
5	F	525	-55	***-1238***	±	69	4380	-364	***-1541***	±	77	<DCGL
6	F	497	-83	***-1873***	±	85	4431	-313	***-1325***	±	71	<DCGL
7	F	513	-67	***-1510***	±	76	4511	-233	***-986***	±	62	<DCGL
8	F	516	-64	***-1442***	±	74	4132	-612	***-2591***	±	100	<DCGL
9	F	573	-7	***-150***	±	24	4304	-440	***-1862***	±	85	<DCGL
10	D	459	-24	***-542***	±	46	4098	-242	***-1025***	±	63	<DCGL
11	D	471	-12	***-270***	±	32	3491	-849	***-3595***	±	118	<DCGL
12	D	475	-8	***-179***	±	26	3812	-528	***-2236***	±	93	<DCGL
13	D	470	-13	***-293***	±	34	3667	-673	***-2850***	±	105	<DCGL
14	D	457	-26	***-587***	±	47	3812	-528	***-2236***	±	93	<DCGL
15	D	458	-25	***-565***	±	47	3917	-423	***-1791***	±	83	<DCGL
16	D	430	-53	***-1200***	±	68	4584	244	***1033***	±	63	<DCGL
17	D	462	-21	***-474***	±	43	4377	37	***156***	±	24	<DCGL
18	D	451	-32	***-723***	±	53	4394	54	***228***	±	30	<DCGL
19	D	462	-21	***-474***	±	43	4820	480	***2032***	±	88	<DCGL
20	D	460	-23	***-519***	±	45	4473	133	***563***	±	46	<DCGL
21	D	522	39	***887***	±	58	4387	47	***199***	±	28	<DCGL
22	D	572	89	***2020***	±	88	4572	232	***982***	±	61	<DCGL
23	D	573	90	***2043***	±	89	4365	25	***105***	±	20	<DCGL
24	D	557	74	***1680***	±	80	4423	83	***351***	±	37	<DCGL
25	D	492	9	***206***	±	28	4724	384	***1625***	±	79	<DCGL
26	D	537	54	***1227***	±	69	4684	344	***1456***	±	75	<DCGL
27	D	531	48	***1091***	±	65	4701	361	***1528***	±	77	<DCGL
28	D	508	25	***569***	±	47	4661	321	***1359***	±	72	<DCGL
29	D	522	39	***887***	±	58	4719	379	***1604***	±	79	<DCGL
30	D	538	55	***1249***	±	69	3769	-571	***-2418***	±	96	<DCGL
31	D	630	147	***3336***	±	113	4099	-241	***-1021***	±	63	<DCGL
32	D	553	70	***1590***	±	78	4184	-156	***-661***	±	50	<DCGL
33	D	540	57	***1295***	±	71	3913	-427	***-1808***	±	83	<DCGL

Philotechnics Analytical Worksheet

VAPAHCS - Building 2

3801 Miranda Ave. Palo Alto, CA

Survey Unit 4 Room A04 Cold Room		Beta 203439		Gamma 246986	
Surface		Bkg (CPM)	MDC (dpm)	Bkg (CPM)	MDC (dpm)
Ambient	A	478.3	2375.4	3965.6	1253.2
Drywall	D	482.9	2386.5	4340.1	1310.4
Floor	F	579.6	2608.0	4743.9	1369.4
Metal	M	431.2	2258.9	3658.1	1204.1
Beta Meter Efficiency		4.41%			
Gamma Meter Efficiency		23.62%			

Sample	Surface	Beta Gross CPM	Beta Net CPM	Beta DPM /100CM2	±	1.96 Sigma	Gamma Gross CPM	Gamma Net CPM	Gamma DPM /100CM2	±	1.96 Sigma	Comment
1	F	705	125	***2844***	±	105	4574	-170	***-719***	±	53	<DCGL
2	F	637	57	***1302***	±	71	4831	87	***369***	±	38	<DCGL
3	D	518	35	***796***	±	55	4057	-283	***-1199***	±	68	<DCGL
4	D	608	125	***2837***	±	104	4542	202	***855***	±	57	<DCGL
5	F	568	-12	***-263***	±	32	3891	-853	***-3611***	±	118	<DCGL
6	D	539	56	***1272***	±	70	3967	-373	***-1580***	±	78	<DCGL
7	D	529	46	***1045***	±	63	4125	-215	***-911***	±	59	<DCGL
8	F	552	-28	***-626***	±	49	4000	-744	***-3149***	±	110	<DCGL
9	D	629	146	***3313***	±	113	4640	300	***1270***	±	70	<DCGL
10	D	553	70	***1590***	±	78	4345	5	***21***	±	9	<DCGL
11	D	544	61	***1385***	±	73	4497	157	***664***	±	51	<DCGL
12	D	566	83	***1884***	±	85	4385	45	***190***	±	27	<DCGL
13	D	409	-74	***-1676***	±	80	4289	-51	***-216***	±	29	<DCGL
14	D	447	-36	***-814***	±	56	4318	-22	***-94***	±	19	<DCGL
15	D	503	20	***456***	±	42	4433	93	***393***	±	39	<DCGL
16	D	556	73	***1658***	±	80	4707	367	***1553***	±	77	<DCGL
17	D	480	-3	***-66***	±	16	4790	450	***1905***	±	86	<DCGL
18	D	430	-53	***-1200***	±	68	4250	-90	***-381***	±	38	<DCGL
19	D	531	48	***1091***	±	65	4556	216	***914***	±	59	<DCGL
20	D	451	-32	***-723***	±	53	4409	69	***292***	±	33	<DCGL
21	D	489	6	***138***	±	23	4606	266	***1126***	±	66	<DCGL
22	D	470	-13	***-293***	±	34	4346	6	***25***	±	10	<DCGL
23	D	459	-24	***-542***	±	46	3628	-712	***-3015***	±	108	<DCGL
24	D	524	41	***932***	±	60	4683	343	***1452***	±	75	<DCGL
25	D	479	-4	***-88***	±	18	4490	150	***635***	±	49	<DCGL
26	D	542	59	***1340***	±	72	5101	761	***3221***	±	111	<DCGL
27	D	547	64	***1454***	±	75	5214	874	***3700***	±	119	<DCGL
28	A	458	-20	***-460***	±	42	4501	535	***2267***	±	93	<DCGL
29	A	537	59	***1331***	±	72	4536	570	***2415***	±	96	<DCGL

Philotechnics Analytical Worksheet

VAPAHCS - Building 2

3801 Miranda Ave. Palo Alto, CA

Survey Unit 5 Room A06 & A06B		Beta 203439		Alpha 212233	
Surface		Bkg (CPM)	MDC (dpm)	Bkg (CPM)	MDC (dpm)
Ambient	A	478.3	2375.4	0.4	47.8
Drywall	D	482.9	2386.5	0.8	57.6
Floor	F	579.6	2608.0	1.0	61.6
Metal	M	431.2	2258.9	0.6	53.1
Beta Meter Efficiency		4.41%			
Alpha Meter Efficiency		12.43%			

Sample	Surface	Beta Gross CPM	Beta Net CPM	Beta DPM /100CM2	±	1.96 Sigma	Alpha Gross CPM	Alpha Net CPM	Alpha DPM /100CM2	±	1.96 Sigma	Comment
1	F	584	4	***100***	±	20	0	-1	***-8***	±	6	<DCGL
2	F	546	-34	***-762***	±	54	0	-1	***-8***	±	6	<DCGL
3	F	539	-41	***-921***	±	59	1	0	***0***	±	0	<DCGL
4	F	561	-19	***-422***	±	40	3	2	***16***	±	8	<DCGL
5	F	592	12	***281***	±	33	0	-1	***-8***	±	6	<DCGL
6	F	598	18	***417***	±	40	2	1	***8***	±	6	<DCGL
7	F	591	11	***259***	±	32	1	0	***0***	±	0	<DCGL
8	F	553	-27	***-603***	±	48	1	0	***0***	±	0	<DCGL
9	A	518	40	***900***	±	59	1	1	***5***	±	4	<DCGL
10	A	488	10	***220***	±	29	0	0	***-3***	±	4	<DCGL
11	A	520	42	***946***	±	60	2	2	***13***	±	7	<DCGL
12	D	463	-20	***-451***	±	42	2	1	***10***	±	6	<DCGL
13	D	531	48	***1091***	±	65	1	0	***2***	±	2	<DCGL
14	D	491	8	***184***	±	27	1	0	***2***	±	2	<DCGL
15	D	495	12	***274***	±	32	0	-1	***-6***	±	5	<DCGL
16	D	644	161	***3653***	±	118	1	0	***2***	±	2	<DCGL
17	D	550	67	***1522***	±	76	0	-1	***-6***	±	5	<DCGL
18	D	516	33	***751***	±	54	2	1	***10***	±	6	<DCGL
19	D	509	26	***592***	±	48	0	-1	***-6***	±	5	<DCGL
20	D	557	74	***1680***	±	80	1	0	***2***	±	2	<DCGL
21	D	507	24	***546***	±	46	1	0	***2***	±	2	<DCGL
22	F	587	7	***168***	±	25	1	0	***0***	±	0	<DCGL
23	F	549	-31	***-694***	±	52	0	-1	***-8***	±	6	<DCGL
24	D	466	-17	***-383***	±	38	2	1	***10***	±	6	<DCGL
25	D	456	-27	***-610***	±	48	3	2	***18***	±	8	<DCGL
26	A	560	82	***1853***	±	84	1	1	***5***	±	4	<DCGL
27	D	525	42	***955***	±	61	2	1	***10***	±	6	<DCGL
28	D	534	51	***1159***	±	67	2	1	***10***	±	6	<DCGL
29	D	538	55	***1249***	±	69	1	0	***2***	±	2	<DCGL
30	M	408	-23	***-526***	±	45	3	2	***19***	±	9	<DCGL
31	M	406	-25	***-571***	±	47	0	-1	***-5***	±	4	<DCGL
32	A	495	17	***379***	±	38	0	0	***-3***	±	4	<DCGL
33	F	445	-135	***-3052***	±	108	0	-1	***-8***	±	6	<DCGL
34	M	511	80	***1810***	±	83	0	-1	***-5***	±	4	<DCGL
35	F	546	-34	***-762***	±	54	0	-1	***-8***	±	6	<DCGL
36	F	561	-19	***-422***	±	40	1	0	***0***	±	0	<DCGL
37	M	499	68	***1537***	±	77	1	0	***3***	±	4	<DCGL
38	M	577	146	***3306***	±	113	0	-1	***-5***	±	4	<DCGL
39	M	557	126	***2853***	±	105	1	0	***3***	±	4	<DCGL
40	M	465	34	***766***	±	54	2	1	***11***	±	7	<DCGL
41	M	464	33	***744***	±	53	2	1	***11***	±	7	<DCGL
42	M	360	-71	***-1615***	±	79	2	1	***11***	±	7	<DCGL
43	M	435	4	***86***	±	18	0	-1	***-5***	±	4	<DCGL
44	M	403	-28	***-639***	±	50	0	-1	***-5***	±	4	<DCGL
45	M	360	-71	***-1615***	±	79	3	2	***19***	±	9	<DCGL
46	M	398	-33	***-753***	±	54	1	0	***3***	±	4	<DCGL
47	M	454	23	***517***	±	45	2	1	***11***	±	7	<DCGL
48	A	447	-31	***-710***	±	52	1	1	***5***	±	4	<DCGL
49	A	545	67	***1512***	±	76	1	1	***5***	±	4	<DCGL

Philotechnics Analytical Worksheet

VAPAHCS - Building 2

3801 Miranda Ave. Palo Alto, CA

Survey Unit 6 Room B124		Beta 212233		No Gamma Readings Taken; H-3 & C-14 Only	
Surface		Bkg (CPM)	MDC (dpm)		
Ambient	A	337.2	1646.9		
Drywall	D	327.3	1623.4		
Floor	F	368.1	1718.2		
Metal	M	322.7	1612.3		
Beta Meter Efficiency		5.37%			

Sample	Surface	Beta Gross CPM	Beta Net CPM	Beta DPM /100CM2	±	1.96 Sigma	Gamma Gross CPM	Gamma Net CPM	Gamma DPM /100CM2	±	1.96 Sigma	Comment
1	F	377	9	***166***	±	25	N/A	N/A	N/A	±	N/A	<DCGL
2	F	373	5	***91***	±	19	N/A	N/A	N/A	±	N/A	<DCGL
3	F	304	-64	***-1194***	±	68	N/A	N/A	N/A	±	N/A	<DCGL
4	F	369	1	***17***	±	8	N/A	N/A	N/A	±	N/A	<DCGL
5	F	355	-13	***-244***	±	31	N/A	N/A	N/A	±	N/A	<DCGL
6	F	389	21	***389***	±	39	N/A	N/A	N/A	±	N/A	<DCGL
7	F	341	-27	***-505***	±	44	N/A	N/A	N/A	±	N/A	<DCGL
8	F	386	18	***333***	±	36	N/A	N/A	N/A	±	N/A	<DCGL
9	F	388	20	***371***	±	38	N/A	N/A	N/A	±	N/A	<DCGL
10	F	378	10	***184***	±	27	N/A	N/A	N/A	±	N/A	<DCGL
11	F	380	12	***222***	±	29	N/A	N/A	N/A	±	N/A	<DCGL
12	F	336	-32	***-598***	±	48	N/A	N/A	N/A	±	N/A	<DCGL
13	F	361	-7	***-132***	±	23	N/A	N/A	N/A	±	N/A	<DCGL
14	F	342	-26	***-486***	±	43	N/A	N/A	N/A	±	N/A	<DCGL
15	F	354	-14	***-263***	±	32	N/A	N/A	N/A	±	N/A	<DCGL
16	F	355	-13	***-244***	±	31	N/A	N/A	N/A	±	N/A	<DCGL
17	F	342	-26	***-486***	±	43	N/A	N/A	N/A	±	N/A	<DCGL
18	F	325	-43	***-803***	±	56	N/A	N/A	N/A	±	N/A	<DCGL
19	F	352	-16	***-300***	±	34	N/A	N/A	N/A	±	N/A	<DCGL
20	F	371	3	***54***	±	14	N/A	N/A	N/A	±	N/A	<DCGL
21	F	373	5	***91***	±	19	N/A	N/A	N/A	±	N/A	<DCGL
22	F	353	-15	***-281***	±	33	N/A	N/A	N/A	±	N/A	<DCGL
23	F	368	0	***-2***	±	3	N/A	N/A	N/A	±	N/A	<DCGL
24	F	357	-11	***-207***	±	28	N/A	N/A	N/A	±	N/A	<DCGL
25	F	373	5	***91***	±	19	N/A	N/A	N/A	±	N/A	<DCGL
26	D	396	69	***1279***	±	70	N/A	N/A	N/A	±	N/A	<DCGL
27	D	341	14	***255***	±	31	N/A	N/A	N/A	±	N/A	<DCGL
28	D	336	9	***162***	±	25	N/A	N/A	N/A	±	N/A	<DCGL
29	D	381	54	***1000***	±	62	N/A	N/A	N/A	±	N/A	<DCGL
30	D	382	55	***1019***	±	63	N/A	N/A	N/A	±	N/A	<DCGL
31	D	424	97	***1801***	±	83	N/A	N/A	N/A	±	N/A	<DCGL
32	D	347	20	***367***	±	38	N/A	N/A	N/A	±	N/A	<DCGL
33	D	359	32	***590***	±	48	N/A	N/A	N/A	±	N/A	<DCGL
34	D	373	46	***851***	±	57	N/A	N/A	N/A	±	N/A	<DCGL
35	D	388	61	***1130***	±	66	N/A	N/A	N/A	±	N/A	<DCGL
36	D	368	41	***758***	±	54	N/A	N/A	N/A	±	N/A	<DCGL
37	D	361	34	***628***	±	49	N/A	N/A	N/A	±	N/A	<DCGL
38	D	369	42	***777***	±	55	N/A	N/A	N/A	±	N/A	<DCGL
39	D	366	39	***721***	±	53	N/A	N/A	N/A	±	N/A	<DCGL
40	D	359	32	***590***	±	48	N/A	N/A	N/A	±	N/A	<DCGL
41	D	374	47	***870***	±	58	N/A	N/A	N/A	±	N/A	<DCGL
42	D	331	4	***69***	±	16	N/A	N/A	N/A	±	N/A	<DCGL
43	D	320	-7	***-136***	±	23	N/A	N/A	N/A	±	N/A	<DCGL
44	D	315	-12	***-229***	±	30	N/A	N/A	N/A	±	N/A	<DCGL

Philotechnics Analytical Worksheet

VAPAHCS - Building 2

3801 Miranda Ave. Palo Alto, CA

Survey Unit 7 Room B121, B122, B123	Beta 203439		No Gamma Readings Taken; H-3 & C-14 Only	
Surface	Bkg (CPM)	MDC (dpm)		
Ambient A	478.3	2375.4		
Drywall D	482.9	2386.5		
Floor F	579.6	2608.0		
Metal M	431.2	2258.9		
Beta Meter Efficiency	4.41%			

Sample	Surface	Beta Gross CPM	Beta Net CPM	Beta DPM /100CM2	±	1.96 Sigma	Gamma Gross CPM	Gamma Net CPM	Gamma DPM /100CM2	±	1.96 Sigma	Comment
1	F	610	30	***689***	±	51	N/A	N/A	N/A	±	N/A	<DCGL
2	F	590	10	***236***	±	30	N/A	N/A	N/A	±	N/A	<DCGL
3	F	578	-2	***-36***	±	12	N/A	N/A	N/A	±	N/A	<DCGL
4	F	572	-8	***-172***	±	26	N/A	N/A	N/A	±	N/A	<DCGL
5	F	505	-75	***-1692***	±	81	N/A	N/A	N/A	±	N/A	<DCGL
6	F	572	-8	***-172***	±	26	N/A	N/A	N/A	±	N/A	<DCGL
7	F	577	-3	***-59***	±	15	N/A	N/A	N/A	±	N/A	<DCGL
8	F	559	-21	***-467***	±	42	N/A	N/A	N/A	±	N/A	<DCGL
9	F	588	8	***190***	±	27	N/A	N/A	N/A	±	N/A	<DCGL
10	F	582	2	***54***	±	14	N/A	N/A	N/A	±	N/A	<DCGL
11	F	506	-74	***-1669***	±	80	N/A	N/A	N/A	±	N/A	<DCGL
12	F	519	-61	***-1374***	±	73	N/A	N/A	N/A	±	N/A	<DCGL
13	F	581	1	***32***	±	11	N/A	N/A	N/A	±	N/A	<DCGL
14	F	588	8	***190***	±	27	N/A	N/A	N/A	±	N/A	<DCGL
15	F	596	16	***372***	±	38	N/A	N/A	N/A	±	N/A	<DCGL
16	F	533	-47	***-1057***	±	64	N/A	N/A	N/A	±	N/A	<DCGL
17	F	596	16	***372***	±	38	N/A	N/A	N/A	±	N/A	<DCGL
18	F	573	-7	***-150***	±	24	N/A	N/A	N/A	±	N/A	<DCGL
19	F	544	-36	***-807***	±	56	N/A	N/A	N/A	±	N/A	<DCGL
20	F	545	-35	***-785***	±	55	N/A	N/A	N/A	±	N/A	<DCGL
21	F	570	-10	***-218***	±	29	N/A	N/A	N/A	±	N/A	<DCGL
22	F	582	2	***54***	±	14	N/A	N/A	N/A	±	N/A	<DCGL
23	F	571	-9	***-195***	±	27	N/A	N/A	N/A	±	N/A	<DCGL
24	F	601	21	***485***	±	43	N/A	N/A	N/A	±	N/A	<DCGL
25	F	609	29	***667***	±	51	N/A	N/A	N/A	±	N/A	<DCGL
26	F	594	14	***327***	±	35	N/A	N/A	N/A	±	N/A	<DCGL
27	D	467	-16	***-361***	±	37	N/A	N/A	N/A	±	N/A	<DCGL
28	D	447	-36	***-814***	±	56	N/A	N/A	N/A	±	N/A	<DCGL
29	D	450	-33	***-746***	±	54	N/A	N/A	N/A	±	N/A	<DCGL
30	D	443	-40	***-905***	±	59	N/A	N/A	N/A	±	N/A	<DCGL
31	D	461	-22	***-497***	±	44	N/A	N/A	N/A	±	N/A	<DCGL
32	D	471	-12	***-270***	±	32	N/A	N/A	N/A	±	N/A	<DCGL
33	D	459	-24	***-542***	±	46	N/A	N/A	N/A	±	N/A	<DCGL
34	D	479	-4	***-88***	±	18	N/A	N/A	N/A	±	N/A	<DCGL
35	D	468	-15	***-338***	±	36	N/A	N/A	N/A	±	N/A	<DCGL

Philotechnics Analytical Worksheet

VAPAHCS - Building 2

3801 Miranda Ave. Palo Alto, CA

Survey Unit 8 Room B126, B127, B128	Beta 203439		No Gamma Readings Taken; H-3 & C-14 Only	
Surface	Bkg (CPM)	MDC (dpm)		
Ambient A	478.3	2375.4		
Drywall D	482.9	2386.5		
Floor F	579.6	2608.0		
Metal M	431.2	2258.9		
Beta Meter Efficiency	4.41%			

Sample	Surface	Beta Gross CPM	Beta Net CPM	Beta DPM /100CM2	±	1.96 Sigma	Gamma Gross CPM	Gamma Net CPM	Gamma DPM /100CM2	±	1.96 Sigma	Comment
1	F	632	52	***1188***	±	68	N/A	N/A	N/A	±	N/A	<DCGL
2	F	649	69	***1574***	±	78	N/A	N/A	N/A	±	N/A	<DCGL
3	F	579	-1	***-14***	±	7	N/A	N/A	N/A	±	N/A	<DCGL
4	F	577	-3	***-59***	±	15	N/A	N/A	N/A	±	N/A	<DCGL
5	F	600	20	***463***	±	42	N/A	N/A	N/A	±	N/A	<DCGL
6	F	566	-14	***-308***	±	34	N/A	N/A	N/A	±	N/A	<DCGL
7	F	614	34	***780***	±	55	N/A	N/A	N/A	±	N/A	<DCGL
8	F	548	-32	***-717***	±	52	N/A	N/A	N/A	±	N/A	<DCGL
9	F	619	39	***893***	±	59	N/A	N/A	N/A	±	N/A	<DCGL
10	F	555	-25	***-558***	±	46	N/A	N/A	N/A	±	N/A	<DCGL
11	F	573	-7	***-150***	±	24	N/A	N/A	N/A	±	N/A	<DCGL
12	F	592	12	***281***	±	33	N/A	N/A	N/A	±	N/A	<DCGL
13	F	582	2	***54***	±	14	N/A	N/A	N/A	±	N/A	<DCGL
14	F	600	20	***463***	±	42	N/A	N/A	N/A	±	N/A	<DCGL
15	F	727	147	***3342***	±	113	N/A	N/A	N/A	±	N/A	<DCGL
16	F	703	123	***2798***	±	104	N/A	N/A	N/A	±	N/A	<DCGL
17	F	577	-3	***-59***	±	15	N/A	N/A	N/A	±	N/A	<DCGL
18	F	586	6	***145***	±	24	N/A	N/A	N/A	±	N/A	<DCGL
19	F	559	-21	***-467***	±	42	N/A	N/A	N/A	±	N/A	<DCGL
20	F	551	-29	***-649***	±	50	N/A	N/A	N/A	±	N/A	<DCGL
21	F	560	-20	***-444***	±	41	N/A	N/A	N/A	±	N/A	<DCGL
22	F	550	-30	***-671***	±	51	N/A	N/A	N/A	±	N/A	<DCGL
23	F	619	39	***893***	±	59	N/A	N/A	N/A	±	N/A	<DCGL
24	F	559	-21	***-467***	±	42	N/A	N/A	N/A	±	N/A	<DCGL
25	F	595	15	***349***	±	37	N/A	N/A	N/A	±	N/A	<DCGL
26	D	465	-18	***-406***	±	39	N/A	N/A	N/A	±	N/A	<DCGL
27	D	462	-21	***-474***	±	43	N/A	N/A	N/A	±	N/A	<DCGL
28	D	465	-18	***-406***	±	39	N/A	N/A	N/A	±	N/A	<DCGL
29	D	473	-10	***-224***	±	29	N/A	N/A	N/A	±	N/A	<DCGL
30	D	446	-37	***-837***	±	57	N/A	N/A	N/A	±	N/A	<DCGL
31	D	480	-3	***-66***	±	16	N/A	N/A	N/A	±	N/A	<DCGL
32	D	463	-20	***-451***	±	42	N/A	N/A	N/A	±	N/A	<DCGL
33	D	491	8	***184***	±	27	N/A	N/A	N/A	±	N/A	<DCGL
34	D	495	12	***274***	±	32	N/A	N/A	N/A	±	N/A	<DCGL
35	D	483	0	***2***	±	3	N/A	N/A	N/A	±	N/A	<DCGL

Philotechnics Analytical Worksheet

VAPAHCS - Building 2

3801 Miranda Ave. Palo Alto, CA

Survey Unit 9 Room B131A		Beta 212233		No Gamma Readings Taken; H-3 & C-14 Only	
Surface		Bkg (CPM)	MDC (dpm)		
Ambient	A	337.2	1646.9		
Drywall	D	327.3	1623.4		
Floor	F	368.1	1718.2		
Metal	M	322.7	1612.3		
Beta Meter Efficiency		5.37%			

Sample	Surface	Beta Gross CPM	Beta Net CPM	Beta DPM /100CM2	±	1.96 Sigma	Gamma Gross CPM	Gamma Net CPM	Gamma DPM /100CM2	±	1.96 Sigma	Comment
1	F	356	-12	***-225***	±	29	N/A	N/A	N/A	±	N/A	<DCGL
2	F	367	-1	***-20***	±	9	N/A	N/A	N/A	±	N/A	<DCGL
3	F	352	-16	***-300***	±	34	N/A	N/A	N/A	±	N/A	<DCGL
4	F	391	23	***426***	±	40	N/A	N/A	N/A	±	N/A	<DCGL
5	F	365	-3	***-58***	±	15	N/A	N/A	N/A	±	N/A	<DCGL
6	F	347	-21	***-393***	±	39	N/A	N/A	N/A	±	N/A	<DCGL
7	F	377	9	***166***	±	25	N/A	N/A	N/A	±	N/A	<DCGL
8	F	373	5	***91***	±	19	N/A	N/A	N/A	±	N/A	<DCGL
9	F	331	-37	***-691***	±	52	N/A	N/A	N/A	±	N/A	<DCGL
10	F	369	1	***17***	±	8	N/A	N/A	N/A	±	N/A	<DCGL
11	F	339	-29	***-542***	±	46	N/A	N/A	N/A	±	N/A	<DCGL
12	F	352	-16	***-300***	±	34	N/A	N/A	N/A	±	N/A	<DCGL
13	F	354	-14	***-263***	±	32	N/A	N/A	N/A	±	N/A	<DCGL
14	F	371	3	***54***	±	14	N/A	N/A	N/A	±	N/A	<DCGL
15	F	360	-8	***-151***	±	24	N/A	N/A	N/A	±	N/A	<DCGL
16	F	377	9	***166***	±	25	N/A	N/A	N/A	±	N/A	<DCGL
17	F	412	44	***818***	±	56	N/A	N/A	N/A	±	N/A	<DCGL
18	F	393	25	***464***	±	42	N/A	N/A	N/A	±	N/A	<DCGL
19	F	368	0	***-2***	±	3	N/A	N/A	N/A	±	N/A	<DCGL
20	F	376	8	***147***	±	24	N/A	N/A	N/A	±	N/A	<DCGL
21	D	394	67	***1242***	±	69	N/A	N/A	N/A	±	N/A	<DCGL
22	D	358	31	***572***	±	47	N/A	N/A	N/A	±	N/A	<DCGL
23	D	367	40	***739***	±	53	N/A	N/A	N/A	±	N/A	<DCGL
24	D	349	22	***404***	±	39	N/A	N/A	N/A	±	N/A	<DCGL
25	D	383	56	***1037***	±	63	N/A	N/A	N/A	±	N/A	<DCGL
26	D	369	42	***777***	±	55	N/A	N/A	N/A	±	N/A	<DCGL
27	D	359	32	***590***	±	48	N/A	N/A	N/A	±	N/A	<DCGL
28	D	391	64	***1186***	±	68	N/A	N/A	N/A	±	N/A	<DCGL
29	D	335	8	***143***	±	23	N/A	N/A	N/A	±	N/A	<DCGL
30	D	339	12	***218***	±	29	N/A	N/A	N/A	±	N/A	<DCGL
31	D	346	19	***348***	±	37	N/A	N/A	N/A	±	N/A	<DCGL
32	D	358	31	***572***	±	47	N/A	N/A	N/A	±	N/A	<DCGL
33	D	352	25	***460***	±	42	N/A	N/A	N/A	±	N/A	<DCGL
34	D	349	22	***404***	±	39	N/A	N/A	N/A	±	N/A	<DCGL
35	D	340	13	***236***	±	30	N/A	N/A	N/A	±	N/A	<DCGL
36	D	344	17	***311***	±	35	N/A	N/A	N/A	±	N/A	<DCGL
37	D	332	5	***88***	±	18	N/A	N/A	N/A	±	N/A	<DCGL
38	D	384	57	***1056***	±	64	N/A	N/A	N/A	±	N/A	<DCGL

Philotechnics Analytical Worksheet

VAPAHCS - Building 2

3801 Miranda Ave. Palo Alto, CA

B131B and B131C per communication with R.S. Trimble of Philotechnics. ~~for~~ TZ Austin 8/11/2011

Survey Unit 10 Room ~~B181A~~		Beta 212233		No Gamma Readings Taken; H-3 & C-14 Only	
Surface		Bkg (CPM)	MDC (dpm)		
Ambient	A	337.2	1646.9		
Drywall	D	327.3	1623.4		
Floor	F	368.1	1718.2		
Metal	M	322.7	1612.3		
Beta Meter Efficiency		5.37%			

Sample	Surface	Beta Gross CPM	Beta Net CPM	Beta DPM /100CM2	±	1.96 Sigma	Gamma Gross CPM	Gamma Net CPM	Gamma DPM /100CM2	±	1.96 Sigma	Comment
1	F	366	-2	*-39*	±	12	N/A	N/A	N/A	±	N/A	<DCGL
2	F	380	12	*222*	±	29	N/A	N/A	N/A	±	N/A	<DCGL
3	F	378	10	*184*	±	27	N/A	N/A	N/A	±	N/A	<DCGL
4	F	383	15	*277*	±	33	N/A	N/A	N/A	±	N/A	<DCGL
5	F	387	19	*352*	±	37	N/A	N/A	N/A	±	N/A	<DCGL
6	F	370	2	*35*	±	12	N/A	N/A	N/A	±	N/A	<DCGL
7	F	369	1	*17*	±	8	N/A	N/A	N/A	±	N/A	<DCGL
8	F	334	-34	*-635*	±	49	N/A	N/A	N/A	±	N/A	<DCGL
9	F	348	-20	*-374*	±	38	N/A	N/A	N/A	±	N/A	<DCGL
10	F	325	-43	*-803*	±	56	N/A	N/A	N/A	±	N/A	<DCGL
11	F	352	-16	*-300*	±	34	N/A	N/A	N/A	±	N/A	<DCGL
12	F	399	31	*575*	±	47	N/A	N/A	N/A	±	N/A	<DCGL
13	F	363	-5	*-95*	±	19	N/A	N/A	N/A	±	N/A	<DCGL
14	F	386	18	*333*	±	36	N/A	N/A	N/A	±	N/A	<DCGL
15	F	404	36	*669*	±	51	N/A	N/A	N/A	±	N/A	<DCGL
16	F	314	-54	*-1007*	±	62	N/A	N/A	N/A	±	N/A	<DCGL
17	F	340	-28	*-523*	±	45	N/A	N/A	N/A	±	N/A	<DCGL
18	F	323	-45	*-840*	±	57	N/A	N/A	N/A	±	N/A	<DCGL
19	F	363	-5	*-95*	±	19	N/A	N/A	N/A	±	N/A	<DCGL
20	F	368	0	*-2*	±	3	N/A	N/A	N/A	±	N/A	<DCGL
21	F	357	-11	*-207*	±	28	N/A	N/A	N/A	±	N/A	<DCGL
22	F	364	-4	*-76*	±	17	N/A	N/A	N/A	±	N/A	<DCGL
23	D	328	1	*13*	±	7	N/A	N/A	N/A	±	N/A	<DCGL
24	D	336	9	*162*	±	25	N/A	N/A	N/A	±	N/A	<DCGL
25	D	337	10	*181*	±	26	N/A	N/A	N/A	±	N/A	<DCGL
26	D	349	22	*404*	±	39	N/A	N/A	N/A	±	N/A	<DCGL
27	D	356	29	*534*	±	45	N/A	N/A	N/A	±	N/A	<DCGL
28	D	332	5	*88*	±	18	N/A	N/A	N/A	±	N/A	<DCGL
29	D	316	-11	*-210*	±	28	N/A	N/A	N/A	±	N/A	<DCGL
30	D	308	-19	*-359*	±	37	N/A	N/A	N/A	±	N/A	<DCGL
31	D	319	-8	*-155*	±	24	N/A	N/A	N/A	±	N/A	<DCGL
32	D	311	-16	*-304*	±	34	N/A	N/A	N/A	±	N/A	<DCGL
33	D	340	13	*236*	±	30	N/A	N/A	N/A	±	N/A	<DCGL
34	D	351	24	*441*	±	41	N/A	N/A	N/A	±	N/A	<DCGL
35	D	326	-1	*-24*	±	10	N/A	N/A	N/A	±	N/A	<DCGL
36	D	350	23	*423*	±	40	N/A	N/A	N/A	±	N/A	<DCGL
37	D	366	39	*721*	±	53	N/A	N/A	N/A	±	N/A	<DCGL
38	D	346	19	*348*	±	37	N/A	N/A	N/A	±	N/A	<DCGL
39	D	358	31	*572*	±	47	N/A	N/A	N/A	±	N/A	<DCGL
40	D	342	15	*274*	±	32	N/A	N/A	N/A	±	N/A	<DCGL
41	D	401	74	*1372*	±	73	N/A	N/A	N/A	±	N/A	<DCGL
42	D	394	67	*1242*	±	69	N/A	N/A	N/A	±	N/A	<DCGL

Philotechnics Analytical Worksheet

VAPAHCS - Building 2

3801 Miranda Ave. Palo Alto, CA

Survey Unit 11 Basement Hallway		Beta 212233		Gamma 203447	
Surface		Bkg (CPM)	MDC (dpm)	Bkg (CPM)	MDC (dpm)
Ambient	A	337.2	1646.9	4225.9	1216.5
Drywall	D	327.3	1623.4	4256.3	1220.8
Floor	F	368.1	1718.2	4338.0	1232.4
Metal	M	322.7	1612.3	2908.0	1011.2
Beta Meter Efficiency		5.37%			
Gamma Meter Efficiency		25.11%			

Sample	Surface	Beta Gross CPM	Beta Net CPM	Beta DPM /100CM2	±	1.96 Sigma	Gamma Gross CPM	Gamma Net CPM	Gamma DPM /100CM2	±	1.96 Sigma	Comment
1	F	400	32	***594***	±	48	5005	667	***2656***	±	101	<DCGL
2	F	354	-14	***-263***	±	32	4094	-244	***-972***	±	61	<DCGL
3	F	423	55	***1022***	±	63	5505	1167	***4648***	±	134	<DCGL
4	F	358	-10	***-188***	±	27	4314	-24	***-96***	±	19	<DCGL
5	F	365	-3	***-58***	±	15	4058	-280	***-1115***	±	65	<DCGL
6	F	335	-33	***-616***	±	49	3956	-382	***-1521***	±	76	<DCGL
7	F	340	-28	***-523***	±	45	3731	-607	***-2417***	±	96	<DCGL
8	F	408	40	***743***	±	53	4818	480	***1912***	±	86	<DCGL
9	F	431	63	***1171***	±	67	4337	-1	***-4***	±	4	<DCGL
10	F	369	1	***17***	±	8	4582	244	***972***	±	61	<DCGL
11	F	334	-34	***-635***	±	49	3805	-533	***-2123***	±	90	<DCGL
12	F	394	26	***482***	±	43	4026	-312	***-1243***	±	69	<DCGL
13	F	371	3	***54***	±	14	4204	-134	***-534***	±	45	<DCGL
14	F	404	36	***669***	±	51	4616	278	***1107***	±	65	<DCGL
15	F	338	-30	***-561***	±	46	3991	-347	***-1382***	±	73	<DCGL
16	F	357	-11	***-207***	±	28	3822	-516	***-2055***	±	89	<DCGL
17	F	405	37	***687***	±	51	4011	-327	***-1302***	±	71	<DCGL
18	F	388	20	***371***	±	38	4549	211	***840***	±	57	<DCGL
19	F	422	54	***1004***	±	62	4926	588	***2342***	±	95	<DCGL
20	F	367	-1	***-20***	±	9	4765	427	***1701***	±	81	<DCGL
21	F	373	5	***91***	±	19	4483	145	***577***	±	47	<DCGL
22	F	339	-29	***-542***	±	46	3711	-627	***-2497***	±	98	<DCGL
23	F	394	26	***482***	±	43	4609	271	***1079***	±	64	<DCGL

APPENDIX G

Wipe Survey Data Sheets and DPM Calculations

Philotechnics Analytical Worksheet
VAPAHCS - Building 2
3801 Miranda Ave. Palo Alto, CA

Scintillation Counter
Laboratory Results

Survey Unit 1	Instrument			
Bldg. 2	3030 - 242683		LSC	
A008, A009, A010	Alpha	Beta	Chan A	Chan B
Background (CPM)	0.8	56.4	15.5	9.5
MDC Value	18.1	81.5	33.9	17.9
Meter Efficiency	39.49%	46.56%	*See Quench Eff.*	

Survey Unit 1 - Rooms A008, A009, A010

	Gross CPM/100 cm^2				Quench and Efficiency			DPM/100 cm^2				
Sample	Alpha Planchet	Beta Planchet	Chan A Scint	Chan B Scint	H#	H-3 Eff.	C-14 Eff.	Alpha Planchet	Beta Planchet	Chan A Scint	Chan B Scint	Comments
1	0	59	16	9	47	54.00%	95.04%	*-2.0*	*5.6*	*0.9*	*-0.5*	<DCGL
2	0	57	19	9	49	53.52%	94.93%	*-2.0*	*1.3*	*6.5*	*-0.5*	<DCGL
3	0	63	23	11	43	54.96%	95.25%	*-2.0*	*14.2*	*13.6*	*1.6*	<DCGL
4	1	81	17	11	42	55.20%	95.31%	*0.5*	*52.8*	*2.7*	*1.6*	<DCGL
5	0	59	10	7	43	54.96%	95.25%	*-2.0*	*5.6*	*-10.0*	*-2.6*	<DCGL
6	0	62	17	8	44	54.72%	95.20%	*-2.0*	*12.0*	*2.7*	*-1.6*	<DCGL
7	0	58	21	10	44	54.72%	95.20%	*-2.0*	*3.4*	*10.1*	*0.5*	<DCGL
8	0	61	19	8	43	54.96%	95.25%	*-2.0*	*9.9*	*6.4*	*-1.6*	<DCGL
9	0	87	15	7	44	54.72%	95.20%	*-2.0*	*65.7*	*-0.9*	*-2.6*	<DCGL
10	0	60	22	6	44	54.72%	95.20%	*-2.0*	*7.7*	*11.9*	*-3.7*	<DCGL
11	0	71	14	15	42	55.20%	95.31%	*-2.0*	*31.4*	*-2.7*	*5.8*	<DCGL
12	0	63	18	5	46	54.24%	95.09%	*-2.0*	*14.2*	*4.6*	*-4.7*	<DCGL
13	1	56	17	15	46	54.24%	95.09%	*0.5*	*-0.9*	*2.8*	*5.8*	<DCGL
14	0	72	14	15	44	54.72%	95.20%	*-2.0*	*33.5*	*-2.7*	*5.8*	<DCGL
15	0	70	18	14	46	54.24%	95.09%	*-2.0*	*29.2*	*4.6*	*4.7*	<DCGL
16	0	75	21	12	50	53.28%	94.88%	*-2.0*	*39.9*	*10.3*	*2.6*	<DCGL
17	0	62	13	8	52	52.80%	94.77%	*-2.0*	*12.0*	*-4.7*	*-1.6*	<DCGL
18	1	68	18	10	46	54.24%	95.09%	*0.5*	*24.9*	*4.6*	*0.5*	<DCGL
19	0	77	21	8	56	51.83%	94.56%	*-2.0*	*44.2*	*10.6*	*-1.6*	<DCGL
20	0	74	17	10	44	54.72%	95.20%	*-2.0*	*37.8*	*2.7*	*0.5*	<DCGL
21	1	59	27	11	54	52.31%	94.67%	*0.5*	*5.6*	*22.0*	*1.6*	<DCGL
22	1	69	21	11	45	54.48%	95.15%	*0.5*	*27.1*	*10.1*	*1.6*	<DCGL
23	0	64	19	6	43	54.96%	95.25%	*-2.0*	*16.3*	*6.4*	*-3.7*	<DCGL
24	0	60	25	6	43	54.96%	95.25%	*-2.0*	*7.7*	*17.3*	*-3.7*	<DCGL
25	2	77	21	3	43	54.96%	95.25%	*3.0*	*44.2*	*10.0*	*-6.8*	<DCGL
26	0	67	24	15	45	54.48%	95.15%	*-2.0*	*22.8*	*15.6*	*5.8*	<DCGL
27	0	67	13	7	43	54.96%	95.25%	*-2.0*	*22.8*	*-4.5*	*-2.6*	<DCGL
28	2	73	14	14	43	54.96%	95.25%	*3.0*	*35.7*	*-2.7*	*4.7*	<DCGL
29	0	91	18	9	45	54.48%	95.15%	*-2.0*	*74.3*	*4.6*	*-0.5*	<DCGL
30	0	71	19	16	44	54.72%	95.20%	*-2.0*	*31.4*	*6.4*	*6.8*	<DCGL
31	1	76	15	7	44	54.72%	95.20%	*0.5*	*42.1*	*-0.9*	*-2.6*	<DCGL
32	0	64	20	16	47	54.00%	95.04%	*-2.0*	*16.3*	*8.3*	*6.8*	<DCGL
33	0	73	15	12	81	45.81%	93.22%	*-2.0*	*35.7*	*-1.1*	*2.7*	<DCGL

Philotechnics Analytical Worksheet
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Survey Unit 2	Instrument			
Bldg. 2	3030 - 242683		LSC	
A05A	Alpha	Beta	Chan A	Chan B
Background (CPM)	0.8	56.4	15.5	9.5
MDC Value	18.1	81.5	33.9	17.9
Meter Efficiency	39.49%	46.56%	*See Quench Eff.*	

Survey Unit 2 - Room A05A

	Gross CPM/100 cm^2				Quench and Efficiency			DPM/100 cm^2				
Sample	Alpha Planchet	Beta Planchet	Chan A Scint	Chan B Scint	H#	H-3 Eff.	C-14 Eff.	Alpha Planchet	Beta Planchet	Chan A Scint	Chan B Scint	Comments
1	0	62	16	3	57	51.59%	94.51%	*-2.0*	*12.0*	*1.0*	*-6.9*	<DCGL
2	0	76	14	12	48	53.76%	94.99%	*-2.0*	*42.1*	*-2.8*	*2.6*	<DCGL
3	0	70	20	10	48	53.76%	94.99%	*-2.0*	*29.2*	*8.4*	*0.5*	<DCGL
4	1	77	14	6	50	53.28%	94.88%	*0.5*	*44.2*	*-2.8*	*-3.7*	<DCGL
5	0	86	14	11	55	52.07%	94.61%	*-2.0*	*63.6*	*-2.9*	*1.6*	<DCGL
6	1	73	16	11	64	49.90%	94.13%	*0.5*	*35.7*	*1.0*	*1.6*	<DCGL
7	0	73	14	11	54	52.31%	94.67%	*-2.0*	*35.7*	*-2.9*	*1.6*	<DCGL
8	1	61	18	6	49	53.52%	94.93%	*0.5*	*9.9*	*4.7*	*-3.7*	<DCGL
9	0	84	17	12	47	54.00%	95.04%	*-2.0*	*59.3*	*2.8*	*2.6*	<DCGL
10	0	62	25	7	48	53.76%	94.99%	*-2.0*	*12.0*	*17.7*	*-2.6*	<DCGL
11	0	69	25	11	50	53.28%	94.88%	*-2.0*	*27.1*	*17.8*	*1.6*	<DCGL
12	0	63	16	6	52	52.80%	94.77%	*-2.0*	*14.2*	*0.9*	*-3.7*	<DCGL
13	0	61	16	9	52	52.80%	94.77%	*-2.0*	*9.9*	*0.9*	*-0.5*	<DCGL
14	0	59	10	11	51	53.04%	94.83%	*-2.0*	*5.6*	*-10.4*	*1.6*	<DCGL
15	0	68	15	7	49	53.52%	94.93%	*-2.0*	*24.9*	*-0.9*	*-2.6*	<DCGL
16	0	82	14	8	49	53.52%	94.93%	*-2.0*	*55.0*	*-2.8*	*-1.6*	<DCGL
17	0	62	10	5	51	53.04%	94.83%	*-2.0*	*12.0*	*-10.4*	*-4.7*	<DCGL
18	0	70	17	8	45	54.48%	95.15%	*-2.0*	*29.2*	*2.8*	*-1.6*	<DCGL
19	0	78	18	9	49	53.52%	94.93%	*-2.0*	*46.4*	*4.7*	*-0.5*	<DCGL
20	0	65	24	15	46	54.24%	95.09%	*-2.0*	*18.5*	*15.7*	*5.8*	<DCGL
21	0	60	15	18	58	51.35%	94.45%	*-2.0*	*7.7*	*-1.0*	*9.0*	<DCGL
22	0	81	16	9	46	54.24%	95.09%	*-2.0*	*52.8*	*0.9*	*-0.5*	<DCGL
23	0	69	15	9	60	50.87%	94.35%	*-2.0*	*27.1*	*-1.0*	*-0.5*	<DCGL
24	0	80	14	11	58	51.35%	94.45%	*-2.0*	*50.7*	*-2.9*	*1.6*	<DCGL
25	1	82	21	14	52	52.80%	94.77%	*0.5*	*55.0*	*10.4*	*4.7*	<DCGL
26	0	75	12	8	58	51.35%	94.45%	*-2.0*	*39.9*	*-6.8*	*-1.6*	<DCGL
27	0	67	19	7	52	52.80%	94.77%	*-2.0*	*22.8*	*6.6*	*-2.6*	<DCGL
28	0	67	22	7	52	52.80%	94.77%	*-2.0*	*22.8*	*12.3*	*-2.6*	<DCGL
29	0	77	13	10	48	53.76%	94.99%	*-2.0*	*44.2*	*-4.7*	*0.5*	<DCGL
30	0	74	12	5	45	54.48%	95.15%	*-2.0*	*37.8*	*-6.4*	*-4.7*	<DCGL
31	0	94	23	8	52	52.80%	94.77%	*-2.0*	*80.8*	*14.2*	*-1.6*	<DCGL
32	0	76	11	11	44	54.72%	95.20%	*-2.0*	*42.1*	*-8.2*	*1.6*	<DCGL
33	0	74	15	12	59	51.11%	94.40%	*-2.0*	*37.8*	*-1.0*	*2.6*	<DCGL
34	0	68	19	8	52	52.80%	94.77%	*-2.0*	*24.9*	*6.6*	*-1.6*	<DCGL
35	0	79	17	14	45	54.48%	95.15%	*-2.0*	*48.5*	*2.8*	*4.7*	<DCGL
36	0	70	19	11	42	55.20%	95.31%	*-2.0*	*29.2*	*6.3*	*1.6*	<DCGL
37	2	75	15	14	43	54.96%	95.25%	*3.0*	*39.9*	*-0.9*	*4.7*	<DCGL
38	0	96	22	9	41	55.44%	95.36%	*-2.0*	*85.1*	*11.7*	*-0.5*	<DCGL
39	1	55	14	10	42	55.20%	95.31%	*0.5*	*-3.0*	*-2.7*	*0.5*	<DCGL
40	0	72	18	5	43	54.96%	95.25%	*-2.0*	*33.5*	*4.5*	*-4.7*	<DCGL
41	0	54	23	9	47	54.00%	95.04%	*-2.0*	*-5.2*	*13.9*	*-0.5*	<DCGL
42	0	65	23	14	47	54.00%	95.04%	*-2.0*	*18.5*	*13.9*	*4.7*	<DCGL
43	1	49	15	11	51	53.04%	94.83%	*0.5*	*-15.9*	*-0.9*	*1.6*	<DCGL
44	1	67	16	8	54	52.31%	94.67%	*0.5*	*22.8*	*1.0*	*-1.6*	<DCGL
45	0	83	14	6	46	54.24%	95.09%	*-2.0*	*57.1*	*-2.8*	*-3.7*	<DCGL
46	0	60	16	6	50	53.28%	94.88%	*-2.0*	*7.7*	*0.9*	*-3.7*	<DCGL
47	0	80	11	9	78	46.53%	93.38%	*-2.0*	*50.7*	*-9.7*	*-0.5*	<DCGL

Philotechnics Analytical Worksheet
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Survey Unit 3	Instrument			
Bldg. 2	3030 - 242683		LSC	
A05	Alpha	Beta	Chan A	Chan B
Background (CPM)	0.8	56.4	15.5	9.5
MDC Value	18.1	81.5	33.9	17.9
Meter Efficiency	39.49%	46.56%	*See Quench Eff.*	

Survey Unit 3 - Room A05

	Gross CPM/100 cm^2				Quench and Efficiency			DPM/100 cm^2				
Sample	Alpha Planchet	Beta Planchet	Chan A Scint	Chan B Scint	H#	H-3 Eff.	C-14 Eff.	Alpha Planchet	Beta Planchet	Chan A Scint	Chan B Scint	Comments
1	0	74	12	12	49	53.52%	94.93%	*-2.0*	*37.8*	*-6.5*	*2.6*	<DCGL
2	0	75	13	6	48	53.76%	94.99%	*-2.0*	*39.9*	*-4.7*	*-3.7*	<DCGL
3	0	79	17	10	61	50.63%	94.29%	*-2.0*	*48.5*	*3.0*	*0.5*	<DCGL
4	0	80	15	5	57	51.59%	94.51%	*-2.0*	*50.7*	*-1.0*	*-4.8*	<DCGL
5	0	67	7	9	50	53.28%	94.88%	*-2.0*	*22.8*	*-16.0*	*-0.5*	<DCGL
6	0	85	18	10	82	45.57%	93.17%	*-2.0*	*61.4*	*5.5*	*0.5*	<DCGL
7	1	65	15	16	57	51.59%	94.51%	*0.5*	*18.5*	*-1.0*	*6.9*	<DCGL
8	1	69	18	7	57	51.59%	94.51%	*0.5*	*27.1*	*4.8*	*-2.6*	<DCGL
9	1	96	13	9	64	49.90%	94.13%	*0.5*	*85.1*	*-5.0*	*-0.5*	<DCGL
10	0	71	16	3	42	55.20%	95.31%	*-2.0*	*31.4*	*0.9*	*-6.8*	<DCGL
11	0	75	14	7	45	54.48%	95.15%	*-2.0*	*39.9*	*-2.8*	*-2.6*	<DCGL
12	1	71	19	14	48	53.76%	94.99%	*0.5*	*31.4*	*6.5*	*4.7*	<DCGL
13	0	62	13	7	45	54.48%	95.15%	*-2.0*	*12.0*	*-4.6*	*-2.6*	<DCGL
14	0	83	18	12	47	54.00%	95.04%	*-2.0*	*57.1*	*4.6*	*2.6*	<DCGL
15	0	67	15	6	56	51.83%	94.56%	*-2.0*	*22.8*	*-1.0*	*-3.7*	<DCGL
16	0	77	16	15	46	54.24%	95.09%	*-2.0*	*44.2*	*0.9*	*5.8*	<DCGL
17	0	84	18	10	42	55.20%	95.31%	*-2.0*	*59.3*	*4.5*	*0.5*	<DCGL
18	0	61	18	11	42	55.20%	95.31%	*-2.0*	*9.9*	*4.5*	*1.6*	<DCGL
19	0	76	17	12	46	54.24%	95.09%	*-2.0*	*42.1*	*2.8*	*2.6*	<DCGL
20	0	73	11	13	45	54.48%	95.15%	*-2.0*	*35.7*	*-8.3*	*3.7*	<DCGL
21	0	66	23	4	42	55.20%	95.31%	*-2.0*	*20.6*	*13.6*	*-5.8*	<DCGL
22	1	68	18	7	54	52.31%	94.67%	*0.5*	*24.9*	*4.8*	*-2.6*	<DCGL
23	1	81	12	11	53	52.55%	94.72%	*0.5*	*52.8*	*-6.7*	*1.6*	<DCGL
24	0	76	17	14	66	49.42%	94.02%	*-2.0*	*42.1*	*3.0*	*4.8*	<DCGL
25	0	72	11	7	49	53.52%	94.93%	*-2.0*	*33.5*	*-8.4*	*-2.6*	<DCGL
26	0	77	21	12	46	54.24%	95.09%	*-2.0*	*44.2*	*10.1*	*2.6*	<DCGL
27	0	55	11	10	59	51.11%	94.40%	*-2.0*	*-3.0*	*-8.8*	*0.5*	<DCGL
28	0	79	23	9	45	54.48%	95.15%	*-2.0*	*48.5*	*13.8*	*-0.5*	<DCGL
29	0	71	19	8	51	53.04%	94.83%	*-2.0*	*31.4*	*6.6*	*-1.6*	<DCGL
30	0	79	16	10	48	53.76%	94.99%	*-2.0*	*48.5*	*0.9*	*0.5*	<DCGL
31	0	82	15	9	44	54.72%	95.20%	*-2.0*	*55.0*	*-0.9*	*-0.5*	<DCGL
32	0	86	10	5	45	54.48%	95.15%	*-2.0*	*63.6*	*-10.1*	*-4.7*	<DCGL
33	0	62	14	8	45	54.48%	95.15%	*-2.0*	*12.0*	*-2.8*	*-1.6*	<DCGL

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Survey Unit 4	Instrument			
Bldg. 2	3030 - 242683		LSC	
A04	Alpha	Beta	Chan A	Chan B
Background (CPM)	0.8	56.4	15.5	9.5
MDC Value	18.1	81.5	33.9	17.9
Meter Efficiency	39.49%	46.56%	*See Quench Eff.*	

Survey Unit 3 - Room A04

	Gross CPM/100 cm^2				Quench and Efficiency			DPM/100 cm^2				
Sample	Alpha Planchet	Beta Planchet	Chan A Scint	Chan B Scint	H#	H-3 Eff.	C-14 Eff.	Alpha Planchet	Beta Planchet	Chan A Scint	Chan B Scint	Comments
1	0	72	11	6	56	51.83%	94.56%	*-2.0*	*33.5*	*-8.7*	*-3.7*	<DCGL
2	0	65	16	6	51	53.04%	94.83%	*-2.0*	*18.5*	*0.9*	*-3.7*	<DCGL
3	1	78	15	13	65	49.66%	94.08%	*0.5*	*46.4*	*-1.0*	*3.7*	<DCGL
4	0	70	16	7	52	52.80%	94.77%	*-2.0*	*29.2*	*0.9*	*-2.6*	<DCGL
5	1	71	20	8	53	52.55%	94.72%	*0.5*	*31.4*	*8.6*	*-1.6*	<DCGL
6	0	66	18	17	59	51.11%	94.40%	*-2.0*	*20.6*	*4.9*	*7.9*	<DCGL
7	0	91	21	13	65	49.66%	94.08%	*-2.0*	*74.3*	*11.1*	*3.7*	<DCGL
8	1	71	11	10	51	53.04%	94.83%	*0.5*	*31.4*	*-8.5*	*0.5*	<DCGL
9	0	64	18	11	61	50.63%	94.29%	*-2.0*	*16.3*	*4.9*	*1.6*	<DCGL
10	0	96	21	9	41	55.44%	95.36%	*-2.0*	*85.1*	*9.9*	*-0.5*	<DCGL
11	0	64	15	11	47	54.00%	95.04%	*-2.0*	*16.3*	*-0.9*	*1.6*	<DCGL
12	0	75	14	10	44	54.72%	95.20%	*-2.0*	*39.9*	*-2.7*	*0.5*	<DCGL
13	0	72	24	9	42	55.20%	95.31%	*-2.0*	*33.5*	*15.4*	*-0.5*	<DCGL
14	0	76	19	10	40	55.69%	95.41%	*-2.0*	*42.1*	*6.3*	*0.5*	<DCGL
15	0	77	15	12	46	54.24%	95.09%	*-2.0*	*44.2*	*-0.9*	*2.6*	<DCGL
16	0	63	12	7	40	55.69%	95.41%	*-2.0*	*14.2*	*-6.3*	*-2.6*	<DCGL
17	0	71	12	9	40	55.69%	95.41%	*-2.0*	*31.4*	*-6.3*	*-0.5*	<DCGL
18	0	69	5	12	40	55.69%	95.41%	*-2.0*	*27.1*	*-18.9*	*2.6*	<DCGL
19	0	69	13	6	40	55.69%	95.41%	*-2.0*	*27.1*	*-4.5*	*-3.7*	<DCGL
20	0	46	17	11	40	55.69%	95.41%	*-2.0*	*-22.3*	*2.7*	*1.6*	<DCGL
21	0	67	28	9	40	55.69%	95.41%	*-2.0*	*22.8*	*22.4*	*-0.5*	<DCGL
22	0	73	14	8	41	55.44%	95.36%	*-2.0*	*35.7*	*-2.7*	*-1.6*	<DCGL
23	2	67	12	9	41	55.44%	95.36%	*3.0*	*22.8*	*-6.3*	*-0.5*	<DCGL
24	0	77	13	8	42	55.20%	95.31%	*-2.0*	*44.2*	*-4.5*	*-1.6*	<DCGL
25	0	79	17	6	41	55.44%	95.36%	*-2.0*	*48.5*	*2.7*	*-3.7*	<DCGL
26	0	69	13	12	42	55.20%	95.31%	*-2.0*	*27.1*	*-4.5*	*2.6*	<DCGL
27	0	63	16	12	46	54.24%	95.09%	*-2.0*	*14.2*	*0.9*	*2.6*	<DCGL
28	0	67	23	7	60	50.87%	94.35%	*-2.0*	*22.8*	*14.7*	*-2.6*	<DCGL
29	0	73	12	10	49	53.52%	94.93%	*-2.0*	*35.7*	*-6.5*	*0.5*	<DCGL

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Survey Unit 5	Instrument			
Bldg. 2	3030 - 242683		LSC	
A06, A06B	Alpha	Beta	Chan A	Chan B
Background (CPM)	0.8	56.4	15.5	9.5
MDC Value	18.1	81.5	33.9	17.9
Meter Efficiency	39.49%	46.56%	*See Quench Eff.*	

Survey Unit 5 - Room A06, A06B

	Gross CPM/100 cm^2				Quench and Efficiency			DPM/100 cm^2				
Sample	Alpha Planchet	Beta Planchet	Chan A Scint	Chan B Scint	H#	H-3 Eff.	C-14 Eff.	Alpha Planchet	Beta Planchet	Chan A Scint	Chan B Scint	Comments
1	1	75	16	5	45	54.48%	95.15%	*0.5*	*39.9*	*0.9*	*-4.7*	<DCGL
2	0	73	15	12	41	55.44%	95.36%	*-2.0*	*35.7*	*-0.9*	*2.6*	<DCGL
3	0	82	14	6	42	55.20%	95.31%	*-2.0*	*55.0*	*-2.7*	*-3.7*	<DCGL
4	0	73	20	5	41	55.44%	95.36%	*-2.0*	*35.7*	*8.1*	*-4.7*	<DCGL
5	0	67	21	18	45	54.48%	95.15%	*-2.0*	*22.8*	*10.1*	*8.9*	<DCGL
6	0	73	17	9	45	54.48%	95.15%	*-2.0*	*35.7*	*2.8*	*-0.5*	<DCGL
7	0	73	10	7	44	54.72%	95.20%	*-2.0*	*35.7*	*-10.1*	*-2.6*	<DCGL
8	0	91	19	8	45	54.48%	95.15%	*-2.0*	*74.3*	*6.4*	*-1.6*	<DCGL
9	0	69	14	9	40	55.69%	95.41%	*-2.0*	*27.1*	*-2.7*	*-0.5*	<DCGL
10	0	80	23	6	41	55.44%	95.36%	*-2.0*	*50.7*	*13.5*	*-3.7*	<DCGL
11	0	77	18	13	44	54.72%	95.20%	*-2.0*	*44.2*	*4.6*	*3.7*	<DCGL
12	0	83	17	9	45	54.48%	95.15%	*-2.0*	*57.1*	*2.8*	*-0.5*	<DCGL
13	0	66	16	6	49	53.52%	94.93%	*-2.0*	*20.6*	*0.9*	*-3.7*	<DCGL
14	1	67	22	12	48	53.76%	94.99%	*0.5*	*22.8*	*12.1*	*2.6*	<DCGL
15	0	70	15	6	43	54.96%	95.25%	*-2.0*	*29.2*	*-0.9*	*-3.7*	<DCGL
16	2	62	14	8	43	54.96%	95.25%	*3.0*	*12.0*	*-2.7*	*-1.6*	<DCGL
17	0	72	18	13	44	54.72%	95.20%	*-2.0*	*33.5*	*4.6*	*3.7*	<DCGL
18	0	88	21	12	42	55.20%	95.31%	*-2.0*	*67.9*	*10.0*	*2.6*	<DCGL
19	0	75	10	5	45	54.48%	95.15%	*-2.0*	*39.9*	*-10.1*	*-4.7*	<DCGL
20	0	69	18	14	42	55.20%	95.31%	*-2.0*	*27.1*	*4.5*	*4.7*	<DCGL
21	1	91	17	15	40	55.69%	95.41%	*0.5*	*74.3*	*2.7*	*5.8*	<DCGL
22	1	64	13	5	40	55.69%	95.41%	*0.5*	*16.3*	*-4.5*	*-4.7*	<DCGL
23	1	64	19	11	40	55.69%	95.41%	*0.5*	*16.3*	*6.3*	*1.6*	<DCGL
24	0	61	23	13	41	55.44%	95.36%	*-2.0*	*9.9*	*13.5*	*3.7*	<DCGL
25	0	79	21	8	40	55.69%	95.41%	*-2.0*	*48.5*	*9.9*	*-1.6*	<DCGL
26	1	64	9	12	41	55.44%	95.36%	*0.5*	*16.3*	*-11.7*	*2.6*	<DCGL
27	0	61	14	6	41	55.44%	95.36%	*-2.0*	*9.9*	*-2.7*	*-3.7*	<DCGL
28	0	65	19	9	41	55.44%	95.36%	*-2.0*	*18.5*	*6.3*	*-0.5*	<DCGL
29	0	64	14	5	42	55.20%	95.31%	*-2.0*	*16.3*	*-2.7*	*-4.7*	<DCGL
30	0	78	15	8	42	55.20%	95.31%	*-2.0*	*46.4*	*-0.9*	*-1.6*	<DCGL
31	0	66	15	16	41	55.44%	95.36%	*-2.0*	*20.6*	*-0.9*	*6.8*	<DCGL
32	0	74	26	7	42	55.20%	95.31%	*-2.0*	*37.8*	*19.0*	*-2.6*	<DCGL
33	0	68	21	7	46	54.24%	95.09%	*-2.0*	*24.9*	*10.1*	*-2.6*	<DCGL
34	0	83	23	13	45	54.48%	95.15%	*-2.0*	*57.1*	*13.8*	*3.7*	<DCGL
35	0	71	19	9	47	54.00%	95.04%	*-2.0*	*31.4*	*6.5*	*-0.5*	<DCGL
36	0	62	20	6	46	54.24%	95.09%	*-2.0*	*12.0*	*8.3*	*-3.7*	<DCGL
37	3	74	19	7	42	55.20%	95.31%	*5.6*	*37.8*	*6.3*	*-2.6*	<DCGL
38	0	75	19	6	40	55.69%	95.41%	*-2.0*	*39.9*	*6.3*	*-3.7*	<DCGL
39	0	79	16	5	39	55.93%	95.47%	*-2.0*	*48.5*	*0.9*	*-4.7*	<DCGL
40	0	75	25	7	44	54.72%	95.20%	*-2.0*	*39.9*	*17.4*	*-2.6*	<DCGL
41	0	57	11	10	43	54.96%	95.25%	*-2.0*	*1.3*	*-8.2*	*0.5*	<DCGL
42	0	67	17	11	42	55.20%	95.31%	*-2.0*	*22.8*	*2.7*	*1.6*	<DCGL
43	2	68	16	10	45	54.48%	95.15%	*3.0*	*24.9*	*0.9*	*0.5*	<DCGL
44	0	59	10	3	43	54.96%	95.25%	*-2.0*	*5.6*	*-10.0*	*-6.8*	<DCGL
45	0	58	15	11	42	55.20%	95.31%	*-2.0*	*3.4*	*-0.9*	*1.6*	<DCGL
46	0	64	29	16	40	55.69%	95.41%	*-2.0*	*16.3*	*24.2*	*6.8*	<DCGL
47	1	71	20	11	42	55.20%	95.31%	*0.5*	*31.4*	*8.2*	*1.6*	<DCGL
48	0	72	16	12	41	55.44%	95.36%	*-2.0*	*33.5*	*0.9*	*2.6*	<DCGL
49	0	68	21	13	49	53.52%	94.93%	*-2.0*	*24.9*	*10.3*	*3.7*	<DCGL

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Scintillation Counter
Laboratory Areas

Background Values		MDC Values	
CPM		Net DPM / 100 cm^2	
Chan A	Chan B	H-3	C-14/S-35
15.5	9.5	33.9	17.9

Survey Unit 6 - Room B124

Sample	Chan A (H-3)	Chan B (C-14)	Quench and Efficiency H#	H-3 Eff.	C-14 Eff.	Chan A (H-3)	Chan B (C-14)	Comments
1	13	13	41	55.44%	95.36%	*-4.5*	*3.7*	<DCGL
2	11	16	42	55.20%	95.31%	*-8.2*	*6.8*	<DCGL
3	19	10	41	55.44%	95.36%	*6.3*	*0.5*	<DCGL
4	18	14	40	55.69%	95.41%	*4.5*	*4.7*	<DCGL
5	13	7	41	55.44%	95.36%	*-4.5*	*-2.6*	<DCGL
6	14	10	42	55.20%	95.31%	*-2.7*	*0.5*	<DCGL
7	15	7	39	55.93%	95.47%	*-0.9*	*-2.6*	<DCGL
8	20	8	41	55.44%	95.36%	*8.1*	*-1.6*	<DCGL
9	14	4	43	54.96%	95.25%	*-2.7*	*-5.8*	<DCGL
10	14	9	44	54.72%	95.20%	*-2.7*	*-0.5*	<DCGL
11	23	9	42	55.20%	95.31%	*13.6*	*-0.5*	<DCGL
12	16	7	40	55.69%	95.41%	*0.9*	*-2.6*	<DCGL
13	17	9	41	55.44%	95.36%	*2.7*	*-0.5*	<DCGL
14	15	13	41	55.44%	95.36%	*-0.9*	*3.7*	<DCGL
15	17	13	41	55.44%	95.36%	*2.7*	*3.7*	<DCGL
16	13	5	40	55.69%	95.41%	*-4.5*	*-4.7*	<DCGL
17	15	9	43	54.96%	95.25%	*-0.9*	*-0.5*	<DCGL
18	19	11	42	55.20%	95.31%	*6.3*	*1.6*	<DCGL
19	23	6	43	54.96%	95.25%	*13.6*	*-3.7*	<DCGL
20	10	9	43	54.96%	95.25%	*-10.0*	*-0.5*	<DCGL
21	21	11	44	54.72%	95.20%	*10.1*	*1.6*	<DCGL
22	15	3	44	54.72%	95.20%	*-0.9*	*-6.8*	<DCGL
23	20	8	40	55.69%	95.41%	*8.1*	*-1.6*	<DCGL
24	17	7	41	55.44%	95.36%	*2.7*	*-2.6*	<DCGL
25	15	10	42	55.20%	95.31%	*-0.9*	*0.5*	<DCGL
26	10	10	41	55.44%	95.36%	*-9.9*	*0.5*	<DCGL
27	13	10	42	55.20%	95.31%	*-4.5*	*0.5*	<DCGL
28	13	9	42	55.20%	95.31%	*-4.5*	*-0.5*	<DCGL
29	14	11	45	54.48%	95.15%	*-2.8*	*1.6*	<DCGL
30	15	11	44	54.72%	95.20%	*-0.9*	*1.6*	<DCGL
31	14	6	42	55.20%	95.31%	*-2.7*	*-3.7*	<DCGL
32	15	11	42	55.20%	95.31%	*-0.9*	*1.6*	<DCGL
33	16	9	43	54.96%	95.25%	*0.9*	*-0.5*	<DCGL
34	8	11	41	55.44%	95.36%	*-13.5*	*1.6*	<DCGL
35	12	11	42	55.20%	95.31%	*-6.3*	*1.6*	<DCGL
36	12	11	43	54.96%	95.25%	*-6.4*	*1.6*	<DCGL
37	17	11	41	55.44%	95.36%	*2.7*	*1.6*	<DCGL
38	14	11	40	55.69%	95.41%	*-2.7*	*1.6*	<DCGL
39	14	15	43	54.96%	95.25%	*-2.7*	*5.8*	<DCGL
40	22	10	40	55.69%	95.41%	*11.7*	*0.5*	<DCGL
41	18	7	40	55.69%	95.41%	*4.5*	*-2.6*	<DCGL
42	16	7	39	55.93%	95.47%	*0.9*	*-2.6*	<DCGL
43	17	9	38	56.17%	95.52%	*2.7*	*-0.5*	<DCGL
44	20	12	39	55.93%	95.47%	*8.0*	*2.6*	<DCGL

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Background Values		MDC Values	
CPM		Net DPM / 100 cm^2	
Chan A	Chan B	H-3	C-14/S-35
15.5	9.5	33.9	17.9

Survey Unit 7 - Rooms B121, B122, B123								
			Quench and Efficiency					
Sample	Chan A (H-3)	Chan B (C-14)	H#	H-3 Eff.	C-14 Eff.	Chan A (H-3)	Chan B (C-14)	Comments
1	7	2	40	55.69%	95.41%	*-15.3*	*-7.9*	<DCGL
2	23	13	40	55.69%	95.41%	*13.5*	*3.7*	<DCGL
3	13	9	41	55.44%	95.36%	*-4.5*	*-0.5*	<DCGL
4	16	7	44	54.72%	95.20%	*0.9*	*-2.6*	<DCGL
5	11	6	45	54.48%	95.15%	*-8.3*	*-3.7*	<DCGL
6	17	10	47	54.00%	95.04%	*2.8*	*0.5*	<DCGL
7	13	11	43	54.96%	95.25%	*-4.5*	*1.6*	<DCGL
8	17	4	44	54.72%	95.20%	*2.7*	*-5.8*	<DCGL
9	14	10	42	55.20%	95.31%	*-2.7*	*0.5*	<DCGL
10	10	7	43	54.96%	95.25%	*-10.0*	*-2.6*	<DCGL
11	14	9	44	54.72%	95.20%	*-2.7*	*-0.5*	<DCGL
12	19	16	40	55.69%	95.41%	*6.3*	*6.8*	<DCGL
13	15	9	40	55.69%	95.41%	*-0.9*	*-0.5*	<DCGL
14	14	10	39	55.93%	95.47%	*-2.7*	*0.5*	<DCGL
15	17	11	42	55.20%	95.31%	*2.7*	*1.6*	<DCGL
16	17	2	40	55.69%	95.41%	*2.7*	*-7.9*	<DCGL
17	15	7	40	55.69%	95.41%	*-0.9*	*-2.6*	<DCGL
18	21	11	40	55.69%	95.41%	*9.9*	*1.6*	<DCGL
19	21	6	39	55.93%	95.47%	*9.8*	*-3.7*	<DCGL
20	23	6	38	56.17%	95.52%	*13.4*	*-3.7*	<DCGL
21	14	14	38	56.17%	95.52%	*-2.7*	*4.7*	<DCGL
22	10	9	39	55.93%	95.47%	*-9.8*	*-0.5*	<DCGL
23	11	15	39	55.93%	95.47%	*-8.0*	*5.8*	<DCGL
24	18	10	39	55.93%	95.47%	*4.5*	*0.5*	<DCGL
25	18	6	39	55.93%	95.47%	*4.5*	*-3.7*	<DCGL
26	22	13	39	55.93%	95.47%	*11.6*	*3.7*	<DCGL
27	12	8	38	56.17%	95.52%	*-6.2*	*-1.6*	<DCGL
28	18	5	39	55.93%	95.47%	*4.5*	*-4.7*	<DCGL
29	28	8	40	55.69%	95.41%	*22.4*	*-1.6*	<DCGL
30	26	8	40	55.69%	95.41%	*18.9*	*-1.6*	<DCGL
31	20	10	40	55.69%	95.41%	*8.1*	*0.5*	<DCGL
32	15	10	42	55.20%	95.31%	*-0.9*	*0.5*	<DCGL
33	19	12	41	55.44%	95.36%	*6.3*	*2.6*	<DCGL
34	14	8	40	55.69%	95.41%	*-2.7*	*-1.6*	<DCGL
35	16	13	41	55.44%	95.36%	*0.9*	*3.7*	<DCGL

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Background Values		MDC Values	
CPM		Net DPM / 100 cm^2	
Chan A	Chan B	H-3	C-14/S-35
15.5	9.5	33.9	17.9

Survey Unit 8 - Rooms B126, B127, B128								
			Quench and Efficiency					
Sample	Chan A (H-3)	Chan B (C-14)	H#	H-3 Eff.	C-14 Eff.	Chan A (H-3)	Chan B (C-14)	Comments
1	23	5	39	55.93%	95.47%	*13.4*	*-4.7*	<DCGL
2	12	8	42	55.20%	95.31%	*-6.3*	*-1.6*	<DCGL
3	14	8	41	55.44%	95.36%	*-2.7*	*-1.6*	<DCGL
4	24	7	40	55.69%	95.41%	*15.3*	*-2.6*	<DCGL
5	17	8	39	55.93%	95.47%	*2.7*	*-1.6*	<DCGL
6	18	7	40	55.69%	95.41%	*4.5*	*-2.6*	<DCGL
7	14	6	42	55.20%	95.31%	*-2.7*	*-3.7*	<DCGL
8	14	5	39	55.93%	95.47%	*-2.7*	*-4.7*	<DCGL
9	15	8	41	55.44%	95.36%	*-0.9*	*-1.6*	<DCGL
10	15	9	42	55.20%	95.31%	*-0.9*	*-0.5*	<DCGL
11	17	6	42	55.20%	95.31%	*2.7*	*-3.7*	<DCGL
12	20	16	40	55.69%	95.41%	*8.1*	*6.8*	<DCGL
13	15	10	40	55.69%	95.41%	*-0.9*	*0.5*	<DCGL
14	20	10	40	55.69%	95.41%	*8.1*	*0.5*	<DCGL
15	21	7	39	55.93%	95.47%	*9.8*	*-2.6*	<DCGL
16	15	6	40	55.69%	95.41%	*-0.9*	*-3.7*	<DCGL
17	11	6	40	55.69%	95.41%	*-8.1*	*-3.7*	<DCGL
18	21	10	45	54.48%	95.15%	*10.1*	*0.5*	<DCGL
19	18	10	47	54.00%	95.04%	*4.6*	*0.5*	<DCGL
20	17	8	45	54.48%	95.15%	*2.8*	*-1.6*	<DCGL
21	13	8	47	54.00%	95.04%	*-4.6*	*-1.6*	<DCGL
22	19	10	44	54.72%	95.20%	*6.4*	*0.5*	<DCGL
23	10	8	44	54.72%	95.20%	*-10.1*	*-1.6*	<DCGL
24	16	12	42	55.20%	95.31%	*0.9*	*2.6*	<DCGL
25	14	9	44	54.72%	95.20%	*-2.7*	*-0.5*	<DCGL
26	20	7	43	54.96%	95.25%	*8.2*	*-2.6*	<DCGL
27	23	4	42	55.20%	95.31%	*13.6*	*-5.8*	<DCGL
28	17	10	44	54.72%	95.20%	*2.7*	*0.5*	<DCGL
29	8	12	42	55.20%	95.31%	*-13.6*	*2.6*	<DCGL
30	17	5	42	55.20%	95.31%	*2.7*	*-4.7*	<DCGL
31	17	4	41	55.44%	95.36%	*2.7*	*-5.8*	<DCGL
32	12	5	41	55.44%	95.36%	*-6.3*	*-4.7*	<DCGL
33	21	8	41	55.44%	95.36%	*9.9*	*-1.6*	<DCGL
34	14	10	41	55.44%	95.36%	*-2.7*	*0.5*	<DCGL
35	9	13	42	55.20%	95.31%	*-11.8*	*3.7*	<DCGL

Philotechnics Analytical Worksheet

VAPAHCS - Building 2

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Background Values		MDC Values	
CPM		Net DPM / 100 cm^2	
Chan A	Chan B	H-3	C-14/S-35
15.5	9.5	33.9	17.9

Survey Unit 9 - Room B131A								
			Quench and Efficiency					
Sample	Chan A (H-3)	Chan B (C-14)	H#	H-3 Eff.	C-14 Eff.	Chan A (H-3)	Chan B (C-14)	Comments
1	15	6	44	54.72%	95.20%	*-0.9*	*-3.7*	<DCGL
2	20	9	52	52.80%	94.77%	*8.5*	*-0.5*	<DCGL
3	13	10	45	54.48%	95.15%	*-4.6*	*0.5*	<DCGL
4	18	7	46	54.24%	95.09%	*4.6*	*-2.6*	<DCGL
5	6	13	42	55.20%	95.31%	*-17.2*	*3.7*	<DCGL
6	22	8	43	54.96%	95.25%	*11.8*	*-1.6*	<DCGL
7	22	11	44	54.72%	95.20%	*11.9*	*1.6*	<DCGL
8	23	9	49	53.52%	94.93%	*14.0*	*-0.5*	<DCGL
9	17	5	43	54.96%	95.25%	*2.7*	*-4.7*	<DCGL
10	20	5	44	54.72%	95.20%	*8.2*	*-4.7*	<DCGL
11	11	9	47	54.00%	95.04%	*-8.3*	*-0.5*	<DCGL
12	10	12	42	55.20%	95.31%	*-10.0*	*2.6*	<DCGL
13	15	6	48	53.76%	94.99%	*-0.9*	*-3.7*	<DCGL
14	20	6	44	54.72%	95.20%	*8.2*	*-3.7*	<DCGL
15	19	9	47	54.00%	95.04%	*6.5*	*-0.5*	<DCGL
16	18	9	49	53.52%	94.93%	*4.7*	*-0.5*	<DCGL
17	11	14	44	54.72%	95.20%	*-8.2*	*4.7*	<DCGL
18	20	13	47	54.00%	95.04%	*8.3*	*3.7*	<DCGL
19	14	5	42	55.20%	95.31%	*-2.7*	*-4.7*	<DCGL
20	5	8	41	55.44%	95.36%	*-18.9*	*-1.6*	<DCGL
21	13	5	41	55.44%	95.36%	*-4.5*	*-4.7*	<DCGL
22	21	5	42	55.20%	95.31%	*10.0*	*-4.7*	<DCGL
23	20	11	41	55.44%	95.36%	*8.1*	*1.6*	<DCGL
24	18	10	41	55.44%	95.36%	*4.5*	*0.5*	<DCGL
25	14	15	41	55.44%	95.36%	*-2.7*	*5.8*	<DCGL
26	16	12	40	55.69%	95.41%	*0.9*	*2.6*	<DCGL
27	9	14	40	55.69%	95.41%	*-11.7*	*4.7*	<DCGL
28	18	6	40	55.69%	95.41%	*4.5*	*-3.7*	<DCGL
29	22	10	43	54.96%	95.25%	*11.8*	*0.5*	<DCGL
30	15	12	44	54.72%	95.20%	*-0.9*	*2.6*	<DCGL
31	9	10	42	55.20%	95.31%	*-11.8*	*0.5*	<DCGL
32	13	10	40	55.69%	95.41%	*-4.5*	*0.5*	<DCGL
33	18	9	42	55.20%	95.31%	*4.5*	*-0.5*	<DCGL
34	9	10	42	55.20%	95.31%	*-11.8*	*0.5*	<DCGL
35	17	5	41	55.44%	95.36%	*2.7*	*-4.7*	<DCGL
36	20	12	41	55.44%	95.36%	*8.1*	*2.6*	<DCGL
37	19	11	41	55.44%	95.36%	*6.3*	*1.6*	<DCGL
38	18	9	41	55.44%	95.36%	*4.5*	*-0.5*	<DCGL

Philotechnics Analytical Worksheet
VAPAHCS - Building 2
3801 Miranda Ave. Palo Alto, CA

Background Values		MDC Values	
CPM		Net DPM / 100 cm^2	
Chan A	Chan B	H-3	C-14/S-35
15.5	9.5	33.9	17.9

Survey Unit 10 - Room B131B, B131C

			Quench and Efficiency					
Sample	Chan A (H-3)	Chan B (C-14)	H#	H-3 Eff.	C-14 Eff.	Chan A (H-3)	Chan B (C-14)	Comments
1	13	13	41	55.44%	95.36%	*-4.5*	*3.7*	<DCGL
2	15	6	44	54.72%	95.20%	*-0.9*	*-3.7*	<DCGL
3	15	5	44	54.72%	95.20%	*-0.9*	*-4.7*	<DCGL
4	11	5	41	55.44%	95.36%	*-8.1*	*-4.7*	<DCGL
5	16	4	42	55.20%	95.31%	*0.9*	*-5.8*	<DCGL
6	18	5	44	54.72%	95.20%	*4.6*	*-4.7*	<DCGL
7	23	9	44	54.72%	95.20%	*13.7*	*-0.5*	<DCGL
8	23	9	45	54.48%	95.15%	*13.8*	*-0.5*	<DCGL
9	18	2	42	55.20%	95.31%	*4.5*	*-7.9*	<DCGL
10	21	15	43	54.96%	95.25%	*10.0*	*5.8*	<DCGL
11	15	9	44	54.72%	95.20%	*-0.9*	*-0.5*	<DCGL
12	15	7	43	54.96%	95.25%	*-0.9*	*-2.6*	<DCGL
13	13	5	46	54.24%	95.09%	*-4.6*	*-4.7*	<DCGL
14	14	8	42	55.20%	95.31%	*-2.7*	*-1.6*	<DCGL
15	23	3	44	54.72%	95.20%	*13.7*	*-6.8*	<DCGL
16	18	11	43	54.96%	95.25%	*4.5*	*1.6*	<DCGL
17	15	14	45	54.48%	95.15%	*-0.9*	*4.7*	<DCGL
18	16	8	44	54.72%	95.20%	*0.9*	*-1.6*	<DCGL
19	18	7	42	55.20%	95.31%	*4.5*	*-2.6*	<DCGL
20	17	7	44	54.72%	95.20%	*2.7*	*-2.6*	<DCGL
21	13	11	44	54.72%	95.20%	*-4.6*	*1.6*	<DCGL
22	16	8	41	55.44%	95.36%	*0.9*	*-1.6*	<DCGL
23	10	8	43	54.96%	95.25%	*-10.0*	*-1.6*	<DCGL
24	8	7	41	55.44%	95.36%	*-13.5*	*-2.6*	<DCGL
25	20	11	41	55.44%	95.36%	*8.1*	*1.6*	<DCGL
26	19	11	41	55.44%	95.36%	*6.3*	*1.6*	<DCGL
27	11	11	42	55.20%	95.31%	*-8.2*	*1.6*	<DCGL
28	13	9	42	55.20%	95.31%	*-4.5*	*-0.5*	<DCGL
29	12	10	41	55.44%	95.36%	*-6.3*	*0.5*	<DCGL
30	12	8	42	55.20%	95.31%	*-6.3*	*-1.6*	<DCGL
31	17	9	42	55.20%	95.31%	*2.7*	*-0.5*	<DCGL
32	29	15	41	55.44%	95.36%	*24.3*	*5.8*	<DCGL
33	11	6	40	55.69%	95.41%	*-8.1*	*-3.7*	<DCGL
34	21	9	40	55.69%	95.41%	*9.9*	*-0.5*	<DCGL
35	19	8	41	55.44%	95.36%	*6.3*	*-1.6*	<DCGL
36	19	9	40	55.69%	95.41%	*6.3*	*-0.5*	<DCGL
37	19	8	40	55.69%	95.41%	*6.3*	*-1.6*	<DCGL
38	20	9	41	55.44%	95.36%	*8.1*	*-0.5*	<DCGL
39	19	10	40	55.69%	95.41%	*6.3*	*0.5*	<DCGL
40	14	6	40	55.69%	95.41%	*-2.7*	*-3.7*	<DCGL
41	18	8	42	55.20%	95.31%	*4.5*	*-1.6*	<DCGL
42	10	6	42	55.20%	95.31%	*-10.0*	*-3.7*	<DCGL

Philotechnics Analytical Worksheet
VAPAHCS - Building 2
3801 Miranda Ave. Palo Alto, CA

Background Values		MDC Values	
CPM		Net DPM / 100 cm^2	
Chan A	Chan B	H-3	C-14/S-35
15.5	9.5	33.9	17.9

Survey Unit 11 - Basement Hallway

			Quench and Efficiency					
Sample	Chan A (H-3)	Chan B (C-14)	H#	H-3 Eff.	C-14 Eff.	Chan A (H-3)	Chan B (C-14)	Comments
1	17	7	52	52.80%	94.77%	*2.8*	*-2.6*	<DCGL
2	12	12	61	50.63%	94.29%	*-6.9*	*2.7*	<DCGL
3	8	10	58	51.35%	94.45%	*-14.6*	*0.5*	<DCGL
4	12	10	57	51.59%	94.51%	*-6.8*	*0.5*	<DCGL
5	14	10	59	51.11%	94.40%	*-2.9*	*0.5*	<DCGL
6	14	5	61	50.63%	94.29%	*-3.0*	*-4.8*	<DCGL
7	20	12	61	50.63%	94.29%	*8.9*	*2.7*	<DCGL
8	18	8	66	49.42%	94.02%	*5.1*	*-1.6*	<DCGL
9	13	11	60	50.87%	94.35%	*-4.9*	*1.6*	<DCGL
10	16	14	58	51.35%	94.45%	*1.0*	*4.8*	<DCGL
11	20	5	60	50.87%	94.35%	*8.8*	*-4.8*	<DCGL
12	15	7	67	49.18%	93.97%	*-1.0*	*-2.7*	<DCGL
13	16	6	60	50.87%	94.35%	*1.0*	*-3.7*	<DCGL
14	17	8	60	50.87%	94.35%	*2.9*	*-1.6*	<DCGL
15	19	6	61	50.63%	94.29%	*6.9*	*-3.7*	<DCGL
16	11	15	74	47.50%	93.60%	*-9.5*	*5.9*	<DCGL
17	17	15	70	48.46%	93.81%	*3.1*	*5.9*	<DCGL
18	14	10	74	47.50%	93.60%	*-3.2*	*0.5*	<DCGL
19	23	11	54	52.31%	94.67%	*14.3*	*1.6*	<DCGL
20	19	14	55	52.07%	94.61%	*6.7*	*4.8*	<DCGL
21	16	16	60	50.87%	94.35%	*1.0*	*6.9*	<DCGL
22	16	6	63	50.15%	94.18%	*1.0*	*-3.7*	<DCGL
23	15	9	69	48.70%	93.86%	*-1.0*	*-0.5*	<DCGL

Enclosure 2

Correspondence between NHPP and Permittee Radiation Safety Officer

From: Huston, Thomas E. [mailto:Thomas.Huston2@va.gov]
Sent: Thursday, September 08, 2011 2:58 PM
To: ljpchp@stanford.edu
Subject: Followup Question for Bldg. 2 Decommissioning Based on NHPP Review of NRC Docket Files

Lance,

NHPP received the NRC docket files on 8/31/2011. They amounted to about a 2-foot stack of papers. I have reviewed the information and identified one item for follow-up.

Back in 1989, during an inspection, NRC identified an issue involving a radioactive source in Room A107 of Bldg. 2. According to the files, the room housed a Bone Mineral Analyzer device with a radioactive source inside. I was unable to determine what radionuclide or activity was involved or what happened to the source. And this room is not included in the Decommissioning Report for Building 2. I suspect that the source has been removed from the area and that it is unlikely that the source ever leaked. However, I will need some supplemental information from you.

1. Can you please confirm that the source was transferred to another authorized area in a different building or to another authorized recipient?

2. Can you verify from past records whether there was any indication of the source leaking in the room? One option to providing information about source leakage is to simply perform a survey in the room (take a few wipes and do a scan with a GM pancake) and confirm no residual radioactivity. If you choose the survey route, please provide ample detail about area wiped, count results, scan survey technique (distance and speed of probe), as well as some calibration information.

My plan is to include this supplemental information as a second enclosure to our letter to NRC—where the main report by Philotechnics would be the first enclosure.

Please provide the information as soon as possible so I can send everything on to NRC for their approval.

Thanks,
Tom

Thomas E. Huston, PhD, CHP
National Health Physics Program (115/HP)
Veterans Health Administration
Wk: 501-257-1578; Cell: 501-454-7264; Fax: 501-257-1570

From: Lance J. Phillips [mailto:ljpchp@stanford.edu]
Sent: Wednesday, September 14, 2011 12:56 PM
To: Huston, Thomas E.
Subject: RE: Followup Question for Bldg. 2 Decommissioning Based on NHPP Review of NRC Docket Files

Tom

After some diligent research we have found the whole story.

There were two separate machines in Bldg2 Room A107. Each housed sealed sources. One housed a I125 source and the other Gd153.

First the I125 unit.

The unit was transferred to another VA bldg. on April 4, 1989. At that time the I125 source was down to 9.13 microCi. A quick decay calculation shows that if for some reason the source was not removed the current activity would be 9.44 E -41 microCi.

Now the Gd153 unit.

The unit was transferred to Stanford HP on October 9, 1992. At that time the Gd153 source was down to 115.3 milliCi. A quick decay calculation shows that if for some reason the source was not removed the current activity would be 2.84 E -4 microCi.

Both sources were repeatedly leak checked and no leakage was ever found.

Hope this helps.

Lance

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1. **Print the label(s):** Select the Print button on the print dialog box that appears. Note: If your browser does not support this function select Print from the File menu to print the label.

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